THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | JUNE 25, 1984 | VOL. XVIII, NO. 25

Special Report on graphics systems
More than pretty pictures./Follows In Depth

In Depth
A United States of information
Follows 60

Next week
A special preview of NCC '84, the National Computer Conference, opening July 9 in Las Vegas

Open market: new services, lower prices

THE CHANGING WORLD OF INTERNATIONAL COMMUNICATIONS

By John Dix
and Susan Blakeney
CW Staff

Part one of a three-part series.

Regulations meant to spur competition between international communications carriers, together with an increased emphasis on international trade by American businesses, are changing the shape of overseas communications services.

That market has traditionally been divided into international data or message services and international voice services. While that division remains, it is growing harder to pigeonhole carriers as providers of one or the other — and harder still to differentiate between domestic and international carriers.

Most of the change in international services has occurred in the overseas data and message services market. These services traditionally have been provided by international record carriers, whose bread-and-butter service is telex — transmission of a 50 bit/sec data stream that is received by a teleprinter, which prints out a hard-copy message.

Leased-line service

The second most prevalent IRC service is leased lines. Supplied in a variety of ways, under a host of different trade names, leased-line service is typically used for voice, voice/data or data, supported at different rates.

Technologically, IRC services are evolving more slowly than similar domestic services. Limiting their advance are the lack of complementary technology in the countries that would be served and the problems inherent in dealing with government-controlled communications agencies in a number of countries.

The overseas connection is thus often the weakest link in efforts to create technologically advanced international services. New domestic message services, for example, will enable users to send various types of messages from a variety of devices, such as mainframes and personal computers. "But when [the message] ends up overseas, it still comes out as a 50 [bit/sec] telex," observed Russ Borgman, vice-president of marketing at FTC Communications, Inc., an IRC based in New York.

This does not mean, however, that the international communications industry is immune to change. Federal regulations put in place in 1981 have turned the industry on its ear. Competition is rife, and the traditional carriers are bracing to do battle with a growing host of newcomers.

To users, perhaps the single most evident change in international communications has resulted from the removal of the

See MARKET page 8

TOP OF THE NEWS

Staffers at Merrill Lynch are bullish on a large-scale prototyping effort recently completed at the investment giant's New York headquarters. Page 6.

■

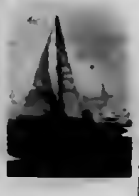
How do you spell relief for a six-year applications backlog? Higbee Co., a Cleveland department store, used a healthy dose of Burroughs Corp. B20 micros, putting more power in the hands of its end users. Page 10.

■

The fine art of communications will be practiced in more ways than one when the Democratic National Convention kicks off next month in San Francisco, where Pacific Bell Telephone Co. is assembling a massive temporary communications network to harvest all the political hay. Page 11.

■

Anyone seen a 60-foot ocean racer around? It was questions like this one that were readily answered with the aid of Wang Laboratories, Inc. micros last week as a 3,200-mile, trans-Atlantic sailboat race concluded in Newport, R.I. Page 16.



■

The first major minicomputer maker with a fully supported version of Unix System V is what Perkin-Elmer Corp. became with its recent announcement of the Xelos Unix derivative. Page 51.

■

Light is shining armor? That's what a recent report on nonimpact printers makes of laser printers, claiming that 1985 just might be the year of the laser printer. Page 69.

■

IBM 3270-PC finding base in DP shops

By Paul Korzeniowski
CW Staff

First customers of the IBM 3270 Personal Computer are experimenting with potential end-user applications while anxiously awaiting software that will transform the 3270-PC into a complete end-user microcomputer-to-mainframe link.

Further, they told *Computerworld* in recent interviews, the 3270-PC is replacing other multisession terminals — some that concurrently support mainframe applications — and finding a home in DP operations rather than sitting on middle managers' desks.

At North American Life and Casualty Co. in Minneapolis, "System programmers are the primary users of the 3270-PC," said Dennie Nielsen, MIS director. "It provides a lot of flexibility for complex system requirements, such as installing a new operating system."

Other 3270-PC administrators interviewed echoed Nielsen's opinion that the microcomputer is currently more useful to system programmers than to middle managers. They seemed satisfied with the 3270-PC's ability to translate mainframe Ebodic files to Personal Computer Ascii files, but pointed out that this translation is only one step in the complicated process of transforming microcomputer data into useful mainframe data and vice versa.

"The end user wants to take data from an [Information Builders, Inc.] Focus data base and use it with [Lotus Development Corp.'s] 1-2-3," explained John Seimer, information center manager at American

See IBM page 8

FOLLOW-UP

Del Monte DP staff goes home again

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — For nearly a year, they were banished from their own corporate home and were forced to live their professional lives as refugees.

For nearly a year, they watched as their once-unified organization was carved into little pieces and scattered to the four winds. For nearly a year, they struggled against the communications breakdowns and organizational disarray that invariably accompany a sudden, traumatic dislocation.

But the hard times are all behind them now, painful memories slowly receding into the past. No longer are the 150 members of Del Monte Corp.'s Information Resources Department battling to keep their heads above water in an unfamiliar, inappropriate workplace. After a prolonged exile in makeshift business offices, the Information Resources staff members have finally returned to the corporate data center that a freak accident had forced them to flee. At long last, Del Monte's systems specialists are again enjoying the comforts and conveniences of home.

With the Information Resources Department's recent return to its former haunts, the curtain has finally fallen on a continuing disaster story that began without warning more than a year ago. On a quiet Sunday morning in May 1983, while a skeleton crew was on duty in Del Monte's corporate MIS facility, an electrical transformer in the basement of the company's headquarters exploded and caught fire [CW, July 4, 1983].

Although the fire was small and was quickly contained, it released a cloud of toxic chemicals that infiltrated parts

See MONTE page 2

NEWS

Evacuation of data center didn't halt two major projects

SAN FRANCISCO — Del Monte Corp.'s hasty evacuation of its corporate data center — and the ensuing 11-month separation — greatly complicated efforts by the firm's Information Resources Department to develop and implement new applications.

"While we were trying to get back on our feet in our alternative site, the company's business wasn't standing still," according to Del Monte's Information Resources vice-president, Kerry Coin. "We were still expected to complete a couple of major development projects on schedule," even though the systems department was unable for a long time to gain access to its headquarters' data center, he said.

One of the projects called for the creation of a plant accounting system, which encompassed four or five large applications. The other critical development effort involved the fundamental redesign of a sales and order-entry system, which the Information Resources Department was required to make operational in time for Del Monte's peak selling season, Coin said.

"Although the temporary loss of our data center cost us several man-months of development effort up front, our Information Resources Department was still able to pull off both projects on time," he said. "I attribute the feat to a lot of long hours, a superhuman effort by all our people and a high level of esprit de corps."

For the most part, of course, the evacuation of Del Monte's corporate data center proved an inconvenience and an unwelcome intrusion. At the same time, however, the unscheduled departure also yielded some unexpected dividends.

"For one thing, the separation accelerated by three to six months our plan to provide every member of our development group with a dedicated terminal," according to Lowman McCarley, director of the firm's management information systems support services.

The dislocation also reportedly forced Del Monte to re-examine and upgrade its disaster recovery plan. "From now on," Coin said, "disaster recovery planning will get more attention and resources here than we gave it in the past. It may even become a full-time job for one of our employees."

HOME from page 1

of Del Monte's nerve center at One Market Plaza and forced the firm to evacuate its corporate computing shop.

Because the Information Resources Department had earlier installed its own independent ventilation system, the machine room reportedly emerged from the disaster without even the slightest trace of chemical contamination. But as a safety precaution, the San Francisco Department of Public Health still forbade the company's systems employees from reoccupying their hastily abandoned workplace.

Thus, in one moment of catastrophic misfortune, a $2.5 billion supplier of diversified food products was rudely stripped of the hub of its international telecommunications and information processing network. Lost, too, was much of the firm's capacity to conduct routine business.

Within a few days, Del Monte was able to scrounge replacements for its suddenly off-limits hardware, improvise a backup data center in an off-site location and resume information processing operations with minimal disruption. The result was that the firm was knocked out of commission for only one full business day and restored its normal administrative activities without losing a single customer order, according to a company spokesman.

But Del Monte's success in speedily replicating its inaccessible MIS facility was achieved at a high price: A systems operation that had previously been consolidated on one floor of the same office building suddenly found itself distributed among six locations throughout this city's financial district.

"Our mainframe [an IBM 3083] was housed not too far from here at a site on Sansome St.," Del Monte's Information Resources vice-president, Kerry Coin, recalled during an interview shortly after the company's homecoming. "Our applications development group was located in a second building, and our office services section was in yet another location."

At first, the breakup of Del Monte's Information Resources Department was scheduled to last only until the following Thanksgiving, by which time the firm had hoped to have its tainted headquarters fully refurbished and ready for reoccupation. But unavoidable hitches in reconnecting the company's four transcontinental communications lines and in gaining the necessary authorization from the local health department delayed the planned return for another five months, Coin said.

Not until April 20 — Good Friday — did Del Monte finally get the go-ahead to begin the long-awaited trek back to the corporate data center it had so unceremoniously forsaken approximately 11 months earlier.

"It's like the difference between night and day," Coin said when asked to compare the firm's makeshift data center to the permanent MIS facility Del Monte recently reclaimed. "As I see it, the big advantage of being back [in our headquarters building] is proximity. It's much easier to see and meet people when they're all together in the same location than when they're spread out all over the place."

Coin's observation is echoed by Lowman McCarley, director of Del Monte's MIS support services. "The move back to our corporate data center has improved communications among peers," McCarley said.

"Our applications and operations people are accustomed to being in the same location, and when they're suddenly physically separated, there's always the potential for blunders and misunderstandings," he said.

In addition to erecting imposing barriers to interpersonal communication, Del Monte's summary expulsion from its main data center hindered the Information Resources Department's efforts to disseminate printed output, McCarley said.

NEWS SUMMARY

ADR® WARE™

ADR®/DATACOM/DB®

The only widely installed relational data base management system being used for high volume update applications. Today.

We've taken state of the art to a new state: Easy and available.
Before you make a software decision mail in the coupon below.
Or call in N.J. (201) 874-9000 or toll free
1-800-ADR-WARE.

DB

☐ Please send me more information about ADR WARE.
☐ Please send me information about ADR seminars.

APPLIED DATA RESEARCH INC.
Route 206 & Orchard Road, CN-8, Princeton, NJ 08540

Name_____
Position_____
Company_____
Address_____
City_____ State_____ Zip_____
Phone Number_____
Computer Equipment_____

ADR® WARE™
From idea to application, we get you there faster.

FIRST USER

Bank finds PIC flexible

Working toward remote communications

By Eric Bender
CW Staff

NEW YORK — Wang Laboratories, Inc. promoted its PIC Image Processing System at last October's introduction as "the single most powerful and fully integrated office automation tool available today." This claim is now being tested as early customers develop applications for the Wang Professional Computer-based PIC, which began shipping in March.

Among the first users is Chemical Bank, which received its first PIC in April. Craig Atkinson, assistant vice-president for information services in the Bankwide Office Systems group, gives the PIC high marks for flexibility and expects the system to find significant uses in electronic mail and elsewhere.

"Image processing has been around for a while," but is commonly limited to straightforward storage and retrieval of images, he said. "Wang has gone to the next level."

Atkinson commented that Chemical Bank was still early in its PIC development work, but predicted that "we may have 25 installed by the end of the year."

Chemical Bank's first working use is likely to be in transferring credit-file-type documents from a Delaware subsidiary, Atkinson said. His group set up a remote communications link with PICs in the lab this month, and he estimated that e working link will be established around September.

'Tremendous applications'

Atkinson also predicted "tremendous applications" for international electronic mail or other forms of communications via PICs hooked up to larger Wang systems. He noted the current difficulty of sending documents between branches around the world, with some pouch or messenger deliveries often taking days.

The PIC's imaging and manipulation capabilities could provide obvious benefits in some of these applications, Atkinson said. However, he cautioned that "we don't want to use it as a replacement for facsimile per se — it's too expensive."

Although Wang's marketing executives often emphasize departmental or intrabuilding office automation uses for the PIC, Atkinson expected Chemical Bank to set up such remote communications uses first.

"Initially, at least, I don't see a cluster of PICs on any given floor, but rather building-to-building applications," Atkinson said. He predicted greater use for the PIC within offices when larger Wang systems, such as the VS series, offer "distribution of imaging records and where regular VS terminals can view them."

Another potential use for PICs — signature verification — "really didn't come from us," said Daniel Lederman, assistant manager of information services. Instead, the idea was suggested by e top bank executive seeing the PIC for the first time.

Get end users involved

"The people on the banking side, the people out there dealing with customers, know their business e lot better than we do," Atkinson commented.

He suggested that the best way to tap the potential of innovative technology is to show end users some possibilities, start to answer their questions and get them involved.

One route is through another Bankwide Office Systems project, the Office Technology Center in Manhattan. The center is set up like a company store with "every type of [personal computer] and almost every type of office system" approved by the bank on display, and the PIC has become one of the most popular systems on exhibit, according to Atkinson.

"We'll give end users whatever support they need," Lederman said. "A lot of hand-holding will be required."

As beta test site, Chemical Bank reaped advantages, 'some grief'

By Eric Bender
CW Staff

NEW YORK — The staff of Chemical Bank's Bankwide Office Systems group here first saw the Wang Laboratories, Inc. PIC Image Processing System in development form in spring 1983, and a secondary beta test system was delivered to the bank last April.

As Wang modified the PIC from the configuration shown in October, "the original beta tests got hardware and software that did not resemble what we got," according to Craig Atkinson, assistant vice-president for information services.

Atkinson acknowledged the advantages in beta testing and pointed out that "you get some of the grief as well." Testing brought out several minor bugs, such as system crashes when the 100th field was filled in the forms-fill application, and some promising enhancements, Lederman said. Dealings with Wang were satisfactory during the testing, he said.

Chemical Bank is moving through three phases with its development, according to Atkinson.

The first is a getting-acquainted stage; the second is establishing PIC-to-PIC links; and a third is hooking the PIC into Wang OIS or VS syetems.

The technology will really take off when PICs can connect fully to the larger Wang systems and images can be integrated with existing Wang data bases on a distributed network, Atkinson suggested. Integrating PICs with the larger machines will require both software development and new dedicated imaging terminals for the larger machines, Lederman noted.

Further down the road, the Wang Systems Network looks like an attractive foundation for extending communications beyond the host machine, he said. "Word processing documents, data files, images, anything — all will run over the same lines."

Lederman pointed out that the PIC's imaging approach is completely different from the image-viewing setup for 3270-type terminals, which IBM announced last February. Images converted by IBM's Scanmaster fit into IBM's Distributed Office Support Software scheme, but the setup provides much less flexibility in handling images than does the PIC, he commented.

Like other users, Chemical Bank is eagerly awaiting Wang's promised delivery of software, which transfers data base information into PIC's forms-fill application. "To simply put data in forms fill, instead of working with a program, is always a programmer's dream," Lederman said. When this transfer facility is available for both PIC and other Wang data bases, "they'll have s fantastic product," he said.

Chemical Bank also would like to replace the PIC's current thermal printers with laser printers hooked up through the bank's VS systems. Wang has scheduled a laser printing option for August shipment.

Another current drawback is external storage. Wang's new 30M-byte hard disk drive will prove useful, but storage limitations may not be overcome until commercial laser disk systems are widely available, Atkinson said.

According to Atkinson, pricing for the PIC seems reasonable, as it can function either as a PIC, a Wang Professional Computer or a Wang workstation. "In a year or two, the PIC might even be one of Wang's really big products," he said.

CORRECTIONS

"Microcomputers await true intelligence" [CW, May 7] should have stated that a microcomputer-based version of Artificial Intelligence Corp.'e Intellect would require 512K bytes of memory. In addition, Jane Eisenberg is the company's director of microcomputer products.

In "Interactive net boosts Pactel's DP, customer service" [CW, May 14], the Pacific Telesis Group (Pactel) was identified as the topic of the story. The story was actually about Pacific Bell Telephone Co. Pactel is the holding company for Pacific Bell, which is the operating company. In addition, the interactive communications system involves some 10,000 rather than 100,000 shared terminals and circuits.

By earning warrants, GTE Communication Systems Corp.' will acquire a 20% interest of Sydis, Inc. over s period of time.

GTE Communications Systems does not currently hold that interest, as reported in the May 14 issue of *Computerworld*.

Hayes Microcomputer Product, Inc.'s Please [CW, June 4] sells for $349, not $395.

The printing speed of Bell & Howell, Inc.'s 6601 printer was erroneously reported in the June 18 *Computerworld*. The 6601 prints at 26,000 line/min.

"AT&T plans to add scope to 3B20 line" [CW, June 18], which appeared as a Softalk column, carried an incorrect byline. The article was written by Jeffry Beeler of CW'e West Coast Bureau.

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld* (ISSN-0010-4841) is published weekly, except: January (6 issues), February (5 issues), March (5 issues), April (7 issues), May (5 issues), June (7 issues), July (5 issues), August (5 issues), September (5 issues), October (7 issues), November (5 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/84 $3.00 + $.50 $2.00 e copy: U.S. — $44 e year; Canada, Central & So. America — $110 e year; Europe — $165 e year; all other countries — $245 e year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

ABC ABP mcc

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Wang predicts bright PIC future, but others skeptical

By Eric Bender
CW Staff

The competitive advantage that Wang Laboratories, Inc.'s PIC Image Processing System holds over a host of other imaging systems is its ability to offer end users the integration of images with word processing, communications and other functions, its vendor has claimed. But some experts question how much customers will pay for these added features.

"The PIC is far too elegant, except for very specific applications," said Stephen Caswell, an analyst with Trigon Systems Group in Toronto. "I wonder how many people need to double the price of the [personal computer] to get integrated text and graphics." Caswell predicted a turn toward such integration, but suggested that combining a personal computer with a standard facsimile machine is a more promising approach.

John Thibault, Wang's director of office systems product marketing, acknowledged that many office automation customers still need to be sold on the need for sophisticated image processing.

But Helayne Jones, manager for imaging systems, said, "The greatest surprise to us was how much more people wanted to do with the PIC." She noted that many early applications are in document transfer, perhaps because users initially may relate the PIC to a facsimile machine. "That's a good entree for people," Jones remarked.

Mary Ann Furniss, director of decision support for Holiday Inns, Inc.'s corporate information resources group in Memphis, said, "We immediately thought of applications for our legal department." Other uses might arise in communicating documents being revised at several locations. "The text would not be modifiable if we sent by facsimile. We don't want to reenter text." PICs also might prove useful in keeping personnel records or in security work, Jones said.

"A lot of the things we do are very visual," she noted. "You can let your imagination run with it."

However, like several other users, Jones said she has not had time to assess the system fully, and no production uses are planned yet.

Jones sees federal agencies also finding work for the PIC. "The Patent Office literally has shoeboxes full of microfiche, with pictures of every single patent application ever filed," and has been searching for appropriate imaging technology to handle its applications for years, she said.

PICs that are now being shipped feature numerous hardware and software enhancements over the version announced last fall, Jones said. The 30M-byte hard disk drive Wang announced this month is a step in the right direction, said Holiday Inns' Furniss, but "I'd rather see a 100M-byte laser disk system." Thibault agreed on the need to offer much greater storage, but said that current laser disk systems do not meet the need. "We're looking for a breakthrough," he noted.

Wang also is working to answer another request: better links between the PIC and other systems. "We plan to increase the imaging offered on all of our products and to allow for low-cost integrated workstations" for larger machines, Jones said.

The data base forms-fill software frequently requested by early users will be announced in September and shipped by year-end, Jones said. This will tap data bases on both PICs and larger Wang systems and permit users to generate reports through VS utilities, she added.

Wang expected to deliver about 1,000 systems between the March shipping date and the end of June, Thibault said. He predicted that something under 20,000 systems will be installed and in production at large accounts during Wang's 1985 fiscal year, which begins next month.

The Wang PIC puts together a Wang Professional Computer, image processing software, a desktop scanner, a thermal or laser printer and a high-resolution monitor. A base system with a 10M-byte hard disk drive costs $14,965; a workstation lacking the scanner sells for $12,115.

Investors bid for MAI unit

NEW YORK — Management Assistance, Inc. (MAI) announced late last week it had received a proposal from an unnamed private investor group to purchase the company's worldwide Basic Four Information Systems operations for more than $105 million in cash and deferred payments.

The acquisition, for $30 million in cash and $70 million in either debt with interest or preferred stock, is subject to approval by the MAI board of directors and shareholders and a favorable tax ruling. MAI said the investor group would assume the operating obligations of Basic Four and plans to continue the current U.S. and international organization while expanding worldwide operations.

The MAI board of directors rejected as inadequate other proposals to acquire separately the worldwide Basic Four and Sorbus Service divisions, an MAI spokesman said.

Merrill Lynch breaks ground with prototyping effort

We've getting things done on time, and we know exactly what we're doing. In this business, that's an accomplishment.

— Peter Metzger, vice-president and manager, order processing systems

While we were designing the data base, the user was working on the prototype. By the time we got to specifications, we knew what the user wanted.

— Marilyn Hack, project manager, operations support

By Paul Gillin
CW Staff

NEW YORK — Those words from staff members sum up some of the results of a large-scale prototyping effort recently completed at Merrill, Lynch, Pierce, Fenner & Smith, Inc. here.

Using a new data-dictionary-based prototyping tool that automates much of the design logic, the 13-member team has nearly completed a large Cobol application project under IBM's IMS and CICS, even though none of its members previously knew Cobol, only one knew IMS and just three had CICS experience.

For the past 18 months, the large brokerage firm has used prototyping to help rewrite one of its bread-and-butter applications — an on-line order processing system that transmits customer orders to the exchange floor and makes sure they are filled correctly.

The project to write the Advanced Order Processing (AOP) system at Merrill Lynch is breaking ground where many companies still fear to tread. AOP consists of more than 50 subprograms that will process orders entered at over 1,000 terminals nationwide. The Cobol system will replace a 12-year-old patchwork of poorly documented assembler language programs that now perform the same function, Merrill Lynch's Metzger said.

The current system runs on an IBM 3033 mainframe under IBM's aged Communication Control Applications Program operating system. Several dozen related programs have been added over the years, Metzger said. This electronic house of cards is so tenuous that a single program can bring the entire order processing system down.

The 13-member team has nearly completed a large Cobol application project under IBM's IMS and CICS, even though none of its members previously knew Cobol, only one knew IMS and just three had CICS experience.

AOP will exhibit none of that fragility. Running under IBM's MVS operating system, it will consist of separately developed and linked programs, allowing for easier maintenance. IBM's Telecommunications Access Method will run on both the 3033 and a separate processor so that even a system crash will not bring communications grinding to a halt.

The AOP project was started 3½ years ago using standard development procedures involving large amounts of documentation. Systems designers interviewed Merrill Lynch employees in the wire and order departments, which process exceptions (orders that cannot be matched), and found they use the bulk of the software. "The first thing we found was that the users' thinking revolved around the old system. They couldn't envision anything differently," Metzger said.

The project team developed a feasibility study, but the document turned out to be so big that no one wanted to read it, Metzger said. Then came the icebreaker. The team put together an advisability study that contained pictures of sample screens the new system would use. The photos of the screens lit a fire under the users where the paper study had not, Metzger noted. "We thought we could take it a step further."

The project management staff decided to try an idea proposed by John Zieg, a contract systems analyst who was then doing maintenance on the old system. Zieg and colleague Bruce Martin had spent the last several years developing a prototyping tool in their spare time and wanted a chance to try it out on the mainframe. "I had nothing to lose at that point," Metzger recalled.

The tool, which is now called Prototyp/CICS and is marketed by Eureka Software Corp. of Hampton Beach, Calif., was used to develop sample screens for a presentation to a large group of users. The feedback was immediate. "I can't stress it enough: This was not something they had to read," Metzger said.

Prototyp/CICS was brought into the project in December 1982. An iterative design process has been proceeding ever since. Users can try out the screens from an on-line terminal using dummy data and then suggest enhancements to the designers. The on-line nature of the prototype also enabled the team to bring the Chicago and West Coast users into the design picture.

Two features of Prototyp/CICS have made the tool especially effective, staff members said. It uses a procedural language to create prototypes, and it includes a data dictionary that stores all data and screen definitions and procedural logic. The logic can quickly be translated into Cobol programs. In fact, the prototype logic was similar enough to that of the production application that data base designers elected to use the same index on the production data base as had been used for the prototype.

"We looked at a lot of options," said Kelly Tuell, project manager in order match and data base development within the AOP project. "Basically, we found we could have saved ourselves a year of design effort if we had used the prototype data base design." Despite its inexperience, the development staff has completed almost all of AOP on time and within budget. The system is expected to be in production by December.

Prototyping was an ideal design vehicle for a project of this sort, Metzger said. "I would prototype any system that I couldn't describe in a specification document."

But prototyping is not always appropriate. "Most managers who work for me are computer people first and business people second," he said. "If it was the other way around and [the clients and the designers] were on the same wavelength, I probably wouldn't prototype."

Development scheme becomes learning experience for broker

NEW YORK — All your best prototyping intentions can be dashed if you are not honest with users about what the final system can and cannot do.

You should also be careful not to throw programming conventions out the window just because the prototype can be changed easily.

Those were among the lessons learned by a project team at Merrill, Lynch, Pierce, Fenner & Smith, Inc. here when they recently redesigned and rewrote a large software system using prototyping.

The design method was useful in igniting user interest in the software's potential, staff members said. However, not all of the features that were added to the prototype could be included in the production software.

One hazard of prototyping is that "you can go too far in offering users blue sky," cautioned Kelly Tuell, project manager in order match and data base development within the Advanced Order Processing project at Merrill Lynch.

Cynthia Wilson Gray, senior systems manager and assistant vice-president in order processing systems, added, "You can get caught up in a prototyping language because of its power and forget that something can't be done in Cobol."

While there is nothing wrong with letting user imaginations run free, the final product must be a compromise, staff members said. Frequent reviews should be conducted to ensure that users know which features of the prototype are going to end up in the production system.

"I can't say it enough: Critical review is essential," Tuell said.

Developers also need to know the limits of the production environment before they start designing. "For example, do you want to be conversational or pseudo conversational?" Gray said. "A prototype will let you go either way, so you have to be aware that there is a distinction."

Gray advised that to ensure consistency, naming and programming conventions should be established before prototyping begins. A procedural approach to prototyping also helps eliminate the need to redesign.

"The idea is you don't want to use trained Cobol programmers," she said. "You want to take prototype statements and translate them into Cobol."

MIGRAINE

How do you spell relief from the pain of Documentation? (S-Y-D-O-C.)

Call (201) 568-9700.

Cut your COBOL Maintenance costs.

SYDOC:
STRUCTURED DOCUMENTATION SYSTEM FOR OS/VS

QUESTION: Which is a bigger headache? The COBOL-documentation problem or the high-cost-of-maintenance problem?

ANSWER: Both.

* * *

We're not kidding. Documentation and high maintenance costs are both parts of the same big headache. Here's why:

1. THE PROBLEM BEGINS WITH DOCUMENTATION: And it begins right at the program-development stage.

Most programmers hate to document. And although they may think they are producing well organized programs, they really have no way of judging. If they produce badly organized programs, they will inevitably produce badly organized documentation, too. One always equals the other.

2. BAD DOCUMENTATION LEADS TO COSTLY MAINTENANCE: Even if the documentation started out being accurate, it's probably never been updated. When modifications occur, someone's got to go back and attempt to divine the underlying logic before new code can be inserted. A long and costly operation.

No wonder COBOL maintenance may consume as much as 75% of your entire budget!

FAST RELIEF WITH SYDOC: Our Structured Documentation System takes the documentation problem off the shoulders of your programmers and puts it where it belongs—on the computer:

• **SYDOC HELPS YOU DEVELOP STRUCTURED PROGRAMS.** It not only provides structured documentation, it is also a very useful guide for the production of structured COBOL programs. Flaws and inconsistencies can be spotted at the development stage. And corrected before they start driving your maintenance costs up.

As a manager, you will—for the first time—have a tool to standardize both your documentation and the quality of your programs.

• **SYDOC MAKES IT EASY TO MODIFY EXISTING PROGRAMS.** It can analyze "orphan" programs without adequate documentation and tell you everything you need to know about the program's structure, logic, variables and relationships. Armed with this knowledge, the maintenance problem shrinks.

No longer is it necessary for skilled programmers to spend days searching for clues about the program's logic. SYDOC makes all necessary information available quickly and easily.

But the best way to find out about SYDOC is to try it. If this remedy doesn't work you'll just have to try another—A-S-P-I-R-I-N.

syncsort INC.

Syncsort Incorporated 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

IBM from page 1

President Lines, Ltd. in San Mateo, Calif. "The 3270 Personal Computer will not do that."

In fact, the microcomputer does have the potential to do it, but a complicated process is required. Mike Maples, IBM product manager for 3270 workstations, said, "Once a user brings a host file to the 3270 Personal Computer, he can use a public domain program to translate the file into a Basic file so that Lotus 1-2-3 will understand the field definitions. Then he can use the import function of Lotus to bring the Basic file into Lotus.

"These steps are required because Lotus has to be told the field definitions," Maples said. "If you have a record that is 30 bytes long and consists of three fields, you have to break it apart so that Lotus knows which bytes are with which fields. This translation process is required with [Microsoft, Inc.'s] Multiplan, [Visicorp's] Visi Calc and other personal computer programs."

Crippled functions

In addition to the translation limitation, minor differences between the 3270 Personal Computer and the IBM Personal Computer cripple certain functions on some programs, the microcomputer managers said.

"Some of the device driver's requirements, specifically for the all-points addressable adapter, will require 3270 Personal Computer versions of software," noted Paul Callahan, systems analyst at the Bank of New England in Boston. "We use Focus and PC Focus. We are hoping that they will support the 3270 Personal Computer in the future."

'Once a user brings a host file to the 3270 Personal Computer, he can use a public domain program to translate the file into a Basic file.'

— Mike Maples, IBM product manager

Some microcomputer software vendors have already adapted their programs to the 3270 Personal Computer. Among them are Lotus' 1-2-3 and Lifetree Software, Inc.'s Volkswriter Deluxe.

Metropolitan Life Insurance Co. in New York, however, is overcoming software limitations by writing its own software, according to Joe Imholz, vice-president at Metropolitan. The company has written a program that allows field office users to extract data from its Cullinet Software, Inc. IDMS data base management system running on an IBM 3033 mainframe, transfer the data to the 3270 Personal Computer and load it into various microcomputer applications, including 1-2-3 and proprietary packages. Currently, 25 microcomputers are in use at Metropolitan. Imholz estimated that 150 microcomputers will be installed at 40 branch offices this fall.

File translation is not the microcomputer administrators' only concern, however. Attaching the 3270 Personal Computer to an IBM 3270 series controller unit could require significant expense and time.

"To run the machine, we had to upgrade our controllers, which was something that we had not anticipated," said American President Lines' Selmer. "One can take a 3278 Model 2 terminal, replace it with a 3270 Personal Computer and, without modification, run one mainframe session. Since we wanted to run more than one mainframe session, we had to enhance the control unit to support multisession terminals."

Once the unit is upgraded, the question of controller performance degradation arises. "Performance questions occur when handling file transfers," Maples said. "The 3270 normally transmits a 1,200M-byte record every 15 to 30 seconds. During file communication, you will be sending several thousand-byte records each second, and all of it passes through the 3274."

Users indicated that they are generally satisfied with the transmission speed of the 3270 Personal Computer. "IBM's file transfer facility seems to work quickly and as advertised," Callahan said.

The 3270 Personal Computer, in addition to presenting technical challenges, also has presented its users with a number of managerial questions. "You have to coordinate work on this machine with a number of people, network control facility, technical support, a CICS administrator and a manager familiar with microcomputers," Callahan said. "It is much different [from] just installing a 3278 terminal."

MARKET from page 1

distinction between domestic and international message carriers, a distinction eliminated when the Federal Communications Commission issued the Record Carrier Competition Act in 1981.

Until then, the five IRCs — including FTC; TRT Telecommunications Corp. in Washington, D.C.; and three New York-based carriers: MCI/Western Union International, ITT World Communications, Inc. and RCA Global Communications, Inc. — provided international services from designated gateway cities. The user could choose among the international carriers, but would typically have to use Western Union to get the message to that carrier.

When the Record Carrier Act was issued, however, IRCs were allowed to enter the domestic market, and the international door was opened to Western Union, the near-monopolist of the domestic market.

Ironed out differences

The same ruling also required the international carriers to provide interconnection services to each other. In effect, this ironed out the differences in area of coverage and enabled even the smaller IRCs to reach all the countries served by the larger carriers.

The ruling also sparked a carrier price war that has, to some degree, given way to competition in the manner in which traffic is handled, including special message handling features and customized billing.

But perhaps the most profound effect of the FCC's ruling originated in the clause that allows Western Union to offer international services. Western Union entered the market in mid-1982 with the advantage of already having a large base of domestic customers — estimated by some to be four times the combined base of all the other IRC subscribers.

As evidence of Western Union's clout, a company spokesman estimated that Western Union already generates 20% of all outbound international telex traffic and 10% of the inbound traffic — a generous percentage, considering the fact that it did not enter the market until August 1982. Fifteen percent of the company's total telex revenues come from international services, according to Janet Boudris, assistant vice-president of Western Union's office message services.

"Obviously, as Western Union has gone into the international market, it has taken its traffic off the IRC networks," noted Richard Kozak, vice-president of finance and administration at TRT. This has forced the IRCs to reduce their dependency on Western Union and build their own domestic customer base.

"It was the strategic objective of TRT to shift as much of its [domestic] traffic as possible off the Western Union network," Kozak said. "Back in 1979-80, as much as 70% of our international traffic came from the Western Union network. Today, we derive about 10% from Western Union."

To cover all its bases, TRT entered into a contract with Western Union wherein that carrier has agreed to deliver 50 million minutes of outbound traffic to TRT over a five-year period. Western Union agreed to this contract at a time when it was uncertain if it would be allowed to offer overseas services.

Two years of that contract will have passed in September, and Western Union has only come through with less than 10% of the total traffic, Kozak said.

Other carriers have seen the writing on the wall. In its effort to prepare for increased competition with Western Union, FTC recently announced that it would provide the interconnection of its domestic telex subscribers through Tymshare, Inc.'s Tymnet packet-switched network. Tymshare bought 80% of FTC in 1982, when the FCC ruled that the company could not be more than 20% owned by foreign interests. (More recently, McDonnell Douglas Corp. purchased Tymshare.)

For FTC, lessening its dependency on Western Union by establishing domestic distribution facilities has paved the way for new service offerings. According to Russ Borgmann, FTC's vice-president of marketing, supporting domestic customers with Tymnet will eventually enable FTC customers to "use their Ascii machines to talk to telex machines overseas in real time, conversationally." The Ascii terminal replaces the telex machine in the U.S., and Tymnet provides the necessary Ascii-to-Baudot code conversion.

NEWS

Bank of America launches $200 million worldwide link

Futuristic project aimed at reducing costs, increasing availability of customer service

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — It is 5 p.m. Greenwich Mean Time. You are assistant treasurer for one of the world's largest banks, and you are on your way from Basel, Switzerland, to an important financial meeting in New York.

As you fly across the Atlantic Ocean, you open up your lap-size personal computer, key in a few encrypted code names and, with the help of an in-house simulation model, begin transferring assets from European subsidiary banks to your company's world headquarters on the West Coast — all in real time.

Far-fetched, you say? Maybe in 1984, but if current developments at Bankamerica Corp. succeed, such a scenario could become a reality by the end of this decade, according to Jay Cook, senior vice-president, global systems services, at the bank.

In a worldwide investment, estimated at more than $200 million, the bank has launched its new International Banking System (IBS), designed to link up the bank's 100 offices and corporate branches in Europe, North America, Latin America and Asia.

'We recognized that it was getting incredibly unwieldy to pull together information from all over the world . . .'
— Jay Cook, senior vice-president, global systems services, Bankamerica Corp.

"We recognized that it was getting incredibly unwieldy to pull together information from all over the world and that we needed something that would capture data at the point of transaction," Cook recalled in a recent interview here.

"We decided that to reduce operating costs and make our customer services more widely available, we had to change our technical environment from a series of stand-alone systems to a common data base system, and so IBS was born."

Using a design team of business, product and technical staff, the first part of the new system was successfully completed earlier this year at the team's European data center in London, after a year of development.

Two new data centers

In a critical extension of the project, the bank has now announced the building of two new data centers in Hong Kong and Singapore, worth more than $90 million, to serve the rapidly growing Asian region.

According to bank officials, the new centers, due to be completed early next year, will be used to automate foreign exchange and money trading, the movement of funds, correspondent banking services and general ledger and customer accounting.

Apart from the developments in Europe and Asia, other IBS centers are expected to be set up in Miami (to serve the bank's Latin America customers), in San Francisco and perhaps in New York (to serve North America).


Cook

At the heart of the new system will be IBM 3083 mainframes, with each regional data center running at least two mainframes — one for daily operations in an on-line environment and running under the IBM MVS/IMS operating system, the other for batch processing operations, such as overnight transactions, using IBM's VM as the operating system — linked to IBM 3178, 3278 and 3279 dumb terminals.

With an estimated 5 million lines of code, application development tools will be much in use in IBS, the chief of which are IMS/VS and Application Development Facility, both from IBM. In addition, the bank will use its own Cobol-based Microstar software package for such applications as file transfer, data base management, spreadsheet interface and terminal emulation.

For telecommunications links, the bank plans to use Digital Equipment Corp. VAX-11/750 minicomputers and its in-house developed Bofanet system, a private packet-switched network based on X.25 protocols, Cook said.

"From a technological standpoint, IBS is not a high-risk system, since it is applying already existing technology," Cook said.

"What makes this venture high-risk is its magnitude, because, to our knowledge, very few companies have implemented a worldwide migration toward common systems," Cook asserted.

Retailer tackles six-year backlog with micro strategy

By Robert Batt
CW West Coast Bureau

CLEVELAND — What do you do when you have a six-year backlog of important applications waiting to be placed on your host computer, and you don't have the resources to accommodate them?

Faced with that question, MIS professionals at the Higbee Co., an independent department store based here, have installed what they term a "parallel data processing system."

Using Burroughs Corp. B20 microcomputers tied to a common data base via a Burroughs B1955 entry-level mainframe, the $250,000 system allows the firm's 11 branch stores to implement such applications as electronic mail, credit collection, advertising scheduling and word processing without tying up Higbee's IBM 4341 central processor.

Patrick McIntyre, vice-president of MIS, explained: "When we drew up our five-year plan for MIS, we separated applications into two groups — those that immediately affect our assets, such as inventory control and merchandise planning, and those that are less immediate but still important, such as administrative or customer service applications."

In the latter category, McIntyre and his colleagues identified about 200 applications. The problem was that the 4341 mainframe was already at its capacity implementing mainstream applications.

As Charles Brown, Higbee's vice-president, put it: "While there were many applications that we could put on-line and which we could justify in terms of cost savings, we recognized that we neither had the time, the capacity, the systems nor the people to do that on our existing mainframe."

In an attempt to escape this bottleneck, Brown and McIntyre hit on the idea of a second "parallel" system containing a network of shared workstations that could also act as stand-alone equipment where required. In this way, they reasoned, the MIS department could retain control over the integrity of vital data while allowing individual stores to develop their own applications.

McIntyre began to look at equipment from several manufacturers, including Digital Equipment Corp., Wang Laboratories, Inc., NCR Corp., IBM, Sperry Corp. and Burroughs.

"In the end, it came down to a decision between Burroughs and IBM. I felt Burroughs offered better support facilities and had products that were more suited to a retail environment than IBM's," the MIS executive said.

Beginning in June 1983, a B20 micro was installed at each branch store and linked to the newly acquired B1955 processor via a multiplex communications line running from the stores to company headquarters.

The B1955 is a 1M-byte machine containing fixed and removable disks, a systems printer and one tape drive. As part of the package, Burroughs also installed its Logic Information Network Compiler (Linc) applications generator.

"Linc is important to us because it generates Cobol code that enables us to prototype applications quickly. This allows us to manage an on-line data base environment without using up a lot of our programmer resources," McIntyre asserted.

The system is designed to be used by store managers, operations managers and executive assistants. By November, the first application — an on-line credit collection system — was up and running. Within nine months, a pilot project for electronic mail had begun, a system for scheduling sales department personnel was installed, a stand-alone word processing system was placed on-line and the company's bridal registry system was automated.

Michigan judge orders bank to pay ATM customer damages

By James Connolly
CW Staff

WESTLAND, Mich. — Dixie Elam's persistence in claiming that she was not to blame for her overdrawn checking account led a judge here to award her $4,600 last week because her bank had relied on computers more than it had relied on people.

The Livonia, Mich., woman went to court to fight the National Bank of Detroit's claim that she withdrew $1,110 through an automated teller machine (ATM). Elam, a customer of the bank for 30 years, maintained that she never made the one $10 and 11 $100 withdrawals, saying the bank made a mistake and sued the bank.

'What it boiled down to was the human element against the machine. The evidence showed that the machine was fallible.'
— Atty. J. Michael Smith

In the end, 18th District Court Judge Benjamin Stanczyk not only awarded Elam the original $1,110, but to Elam's surprise, tripled the damages and added interest, court fees, bounced check fees and legal fees for a total of $4,644.10.

"It wasn't just the money — I could afford to lose the $1,100 and even the legal fees more than other people could. It was mainly because of the bank's attitude that I did it," Elam explained after the verdict. "They wouldn't discuss anything with me other than to flatly tell me that it was my card that was used to withdraw the money. They wouldn't listen to my thoughts on it or investigate my case."

Elam's attorney, J. Michael Smith, added, "What it boiled down to was the human element against the machine. The evidence showed that the machine was fallible." He quoted the judge as saying, "We should be thankful that human beings are still around."

The judge ruled that under the Electronic Funds Transfer Act of 1978, the bank had the burden of proving that Elam had withdrawn the $1,110 and had failed to conduct a good-faith investigation into her claim.

Bank spokesman Thomas Oren declined comment on the case, other than to say that the bank is undecided about appealing the verdict.

Elam's troubles began on January 12, 1983, when the bank notified her that her checking account was depleted. She discovered 12 withdrawals from her account in the previous five weeks and denied making them.

According to Smith, the bank's investigation of Elam's fraudulent withdrawal claim involved only a reading of the magnetic strip on the back of her card to determine how many withdrawals she had made since it was issued.

The bank decided that reading belied Elam's claim.

Elam sued in small claims court, but the case was transferred to district court at the bank's request, although the most money she could have recovered in small claims court was $600.

In testimony last week, Elam, her husband and her son, who knew Elam's personal identification number, denied making the withdrawals. Testifying as an expert witness, computer security consultant Jack Bologna told the judge that errors in ATM systems are a possibility.

Bank officials countered that their system was infallible, but conceded that one transaction record for Elam's account was missing.

Smith argued that the missing record and Bologna's testimony were enough to cast doubt on the system's infallibility and that the bank's investigation was insufficient because the investigators didn't even test the ATM equipment.

Cable net to help Democrats connect at convention

By James Connolly
CW Staff

SAN FRANCISCO — The equivalent of a small city — a city of politicians, political hangers-on, reporters and technicians — will set up camp here next month and test this city's communications capabilities.

The delegates, news media and others attending the five-day Democratic National Convention will require far more than telephones in their hotel rooms. Press galleries, temporary offices and the floor at the Moscone Convention Center will be jammed with telephones, video equipment and computer terminals linking Democratic officials and the news media with each other, their hotels and their home offices.

The assignment for building the necessary communications network is being handled by Pacific Bell Telephone Co. It's an assignment that means laying 600 miles of fiber-optic cable and 3,868 miles of copper cable, most of which will be removed immediately after the convention.

Pacific Bell, the project integrator working in joint

Preparing cables to be used in Democratic convention's net.

ventures with several other communications companies, is installing 2,700 single business lines, 3,150 Centrex lines, 1,000 private lines, 100 video circuits and 550 audio circuits. The company is carrying out the project while handling what spokeswoman Catherine Moss called a superhuman effort to build a communications network in the 4,500-sq-mile area in Southern California that will host the Summer Olympics later in July.

Double challenge

The project coordinator for the Democratic Convention effort noted that — Summer Olympics considerations aside — Pacific Bell faces a double challenge in San Francisco.

The first challenge is that Pacific Bell must complete the San Francisco project without the support of AT&T, noted John G. Harrison, project coordinator. The second challenge involves wiring an old city such as San Francisco.

"The project is serving as a model for the way in which we can expand and extend our imaginations and our services. Not only is this a massive project in its right, but it becomes all the more significant when we find ourselves conducting business in an environment that is new to us," Harrison said.

It is one of the first joint ventures that allows Pacific Bell to serve as the integrator for telecommunications services. Its partners in the joint venture are the Grass Valley Group, a Grass Valley, Calif.-based development and manufacturing firm that specializes in video transmission equipment, and GTE Corp., which is supplying the telephone sets.

In addition to the telephone sets, the system must accommodate the terminals that many of the 10,000 credentialed news reporters will use to transmit their stories as well as terminals allowing television network news crews to exchange information with their production facilities.

More than half the installed lines will service Moscone Center, while others will service some of the 144 convention hotels.

In some cases, Pacific Bell workers have had to rip up streets and walls to install cable, even taking advantage of the recent San Francisco cable car renovations to run cable through existing excavations, Moss noted.

"The age of the city alone creates problems. The streets are old, so many buildings are old. We're wedging cables and wires into cramped and congested places already difficult to access," Harrison said.

Much of the copper cable will be removed after the convention. But most of the fiber-optic material will remain, to be used for future video and data transmissions.

The special construction costs are expected to total $2.9 million, some of which will be recovered through the resale of equipment or its reuse as part of the city's permanent system. The total convention cost for Pacific Bell is $5 million, which will be recouped through special tariffs on those using the convention facilities, according to Moss.

WASHINGTON UPDATE
Mitch Betts
CW Washington Bureau

Congress to determine fate of ICST this summer

WASHINGTON, D.C. — Congress is likely later this summer to reject budget cuts proposed by the Reagan administration for the National Bureau of Standards' Institute for Computer Sciences and Technology (ICST). Instead, congressional aides predicted recently, it will approve the institute's usual budget of $10 million for fiscal 1985.

The fate of the ICST's domestic computer and telecommunications standards activities will be decided this summer by a House-Senate conference committee, which must reconcile the difference between the House-passed budget of $10 million and the Senate-passed budget of $5 million.

The Senate approved the budget cut sought by the Reagan administration in hopes of transferring the ICST's domestic standards work to the private sector in order to demonstrate support for reduced federal spending.

However, the Senate is likely to back down in the conference committee, according to the congressional aides.

In March, a panel of DP users testified that the budget cut would so cripple the institute that it would be better to disband it completely [CW, March 12].

House members request computer security study

WASHINGTON, D.C. — Reps. Dan Glickman (D-Kan.) and William Carney (R-N.Y.), key members of the House of Representatives' Committee on Science and Technology, have urged President Reagan to create a national commission to study computer security and privacy issues.

"Unfortunately, the breadth and multijurisdictional character of these issues prevent any single agency or congressional committee from dealing comprehensively with them," the two congressmen said in a letter to the president. Referring to such issues as computer crime, the vulnerability of critical computer-based national services and privacy concerns, they called for a national commission to develop a "comprehensive framework to guide future actions by the government and the private sector."

The letter followed a recommendation by the committee's Subcommittee on Transportation, Aviation and Materials for such a commission [CW, April 16].

Telex to buy Raytheon Data Systems

By David Gross
CW Staff

NORWOOD, Mass. — Telex Corp. said last week it has agreed in principle to acquire most of the assets of Raytheon Co.'s Data Systems Division for more than $200 million.

Last month, Raytheon announced it was terminating its commercial terminal and equipment division based here [CW, May 28]. It cited a lack of profitability as well as delays in deliveries of Convergent Technologies, Inc. workstations, which were to be the basis of Raytheon's new Signature 8200 office system.

Telex, based in Tulsa, Okla., manufactures VDTs compatible with IBM's 3270 terminal and has been a competitor of Raytheon's in that market. Raytheon was once the largest supplier of IBM 3270-type terminals, particularly to the airline industry, but has seen its market share drop sharply in recent years.

A. Newell Garden, a Raytheon spokesman, said the agreement "will not make a significant difference to us financially," explaining that the company will lose a $95 million after-tax write-off it would have received from discontinued operations.

In a prepared statement, Telex Chairman S.J. Jatras said, "For some time, we have had considerable interest in the airline and commercial data terminal and communications markets served by Raytheon Data Systems. We are looking forward to building on the excellent reputation of Raytheon in these markets."

Raytheon Data Systems currently employs 3,600 people worldwide. Telex said about 2,100 employees of Data Systems and Raytheon Data Services and Leasing Co., a group formed in May, will be retained by Telex. Of the 1,500 other employees, a portion will be absorbed by Raytheon's other operations, and the rest will lose their jobs.

"It will make a significant difference to our customers to have a continuing company run the support systems for them," Garden said. "And we hope it will provide better opportunities for more of our employees."

Garden said Raytheon had "a lot of expressions of interest" in the Data Systems group, "but from companies that just wanted to pick up a few pieces."

Raytheon's Data Systems contributed only about 5% to Raytheon's total revenues in 1983 and sustained a loss of about $23 million on revenues of $367 million. The division lost $6.2 million during the first four months of this year.

The companies said the sale is not definitive and still must be approved by the respective boards of directors and government agencies.

FCC wrestling with issue of protocol conversion

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Should the divested Bell operating companies be allowed to perform end-to-end protocol conversion, thus enabling them to introduce reduced-rate packetized data transmission services to users of asynchronous terminals?

That is an immediate question confronting the Federal Communications Commission, according to three knowledgeable observers who spoke here recently at a conference titled "The New Telephone Companies," sponsored by "FCC Week," a communications industry newsletter based here, and Executive Enterprises, Inc. of New York.

FCC staff member Greg Vogt, who will help formulate the commission's final decision, made it clear that some modification of the present policy — under which the divested Bell operating companies must obtain a waiver before they can include any protocol conversion in a tariffed transmission service — is virtually certain.

The other two speakers — James Denvir, former chief of the Justice Department's AT&T trial staff; and Gary Epstein, former chief of the FCC's Common Carrier Bureau — pointed to a difference between the FCC's policy and the AT&T antitrust settlement that could form the basis for the commission's upcoming decision.

Last November, the FCC adopted its present policy in a proceeding officially known as Docket 80-756, Vogt explained. He added that the commission, "in an overabundance of caution," decided to require waivers for internetwork protocol conversions — typically between X.25 and X.75 — even though it found these were not part of an "enhanced service" under the Second Computer Inquiry decision. (Enhanced services can be offered by the divested Bell operating companies only through separate subsidiaries, unless this requirement is waived beforehand by the FCC.)

The commission now has another opportunity to address this question, Vogt said. Several divested Bell operating companies have filed waiver petitions seeking the commission's approval to perform both internetwork and end-to-end protocol conversion directly, rather than through separate subsidiaries.

Although Vogt did not relate the commission's upcoming decision to the interests of telecommunications users, those interests are very much involved. The divested Bell operating companies argue that if they are allowed to provide end-to-end protocol conversion directly, they will be able to offer packet network services to users of asynchronous terminals, including personal computers. These new services will allegedly be priced way below present dial-up and private line rates and below the prices now charged by current vendors of packetized services.

Epstein said FCC action on the waiver petitions represents the first in a series of decisions — some to be taken by the commission, others by U.S. Federal District Court Judge Harold H. Greene — that will determine the former Bell operating companies' scope of activities for the next 10 to 15 years.

The next major issue, he added, is whether to let the divested operating companies get into nonlocal and noncommunications businesses, such as equipment leasing, software distribution and overseas marketing.

Speaker says banks can fend off finance field intruders

Info services, traditional bank offerings can keep retailers, others out of banks' territory

By James Connolly
CW Staff

BOSTON — Information services for customers, paired with traditional financial services, may help banks survive the intrusion of other institutions into the financial field, an executive of Marine Midland Bank said in a recent speech here.

Microcomputers carry that information and help provide those services, according to Leonard Schwartz, vice-president at the Buffalo, N.Y.-based Marine Midland, who spoke at the Bank Cash Management Users Conference, sponsored by Interactive Data Corp.

Schwartz noted that information vendors such as McDonnell Douglas Automation Co., General Electric Information Services Co. and Automatic Data Processing, Inc., along with several major retailers, have shifted into the financial services market by offering access to automated clearinghouses for electronic funds transfers.

Schwartz

"The only difference between these companies and banks is their inability to hold a Federal Reserve account," said Schwartz, who added that even restrictions on Federal Reserve accounts are likely to fall in the coming years. Those accounts are necessary for moving money through electronic funds transfer systems.

Schwartz noted that a large portion of a bank's business already is information management, an area whose future rests with the ability of the microcomputer to move information throughout a company. The heart of that information management is a bank's ability to tell a customer how much money he has at any given time, but micros allow the bank to go beyond that point and let the customer handle his own transactions — as in home banking — and provide its customers with general investment information.

Schwartz told the cash managers that a logical step would be for regional banks to provide customers with access to an information network.

He cited the case wherein retail stores, such as Sears Roebuck & Co., want to tie in to networks that will allow them to transmit electronic orders, invoices and payments between the stores and their suppliers or customers.

VDTs safe, Cbema tells House panel

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The Computer and Business Equipment Manufacturers Association (Cbema) said in recent testimony before the House Subcommittee on Health and Safety that VDTs "are among the safest devices in the workplace today," but acknowledged that many workers have a profound fear of the computerized office.

Cbema President Vico Henriques told the subcommittee that worker fears about VDTs causing health problems and displacing employees can be neutralized through better education of managers and users, not through government legislation or regulation.

Henriques blamed the news media for reporting sensational allegations of VDT-related health problems and for perpetuating the notion that computers replace people. He also blamed some business managers for failing to accommodate employee needs when introducing computers to the office.

To ease employee fears, Henriques said, "businesses should be educating managers to keep their expectations realistic, to provide proper training and to use computers to enhance people's jobs."

Henriques reiterated Cbema's position that VDTs do not emit harmful radiation. "There are no health and safety issues," he said. "There are comfort issues."

In the testimony, he said workers and managers have several misconceptions about the health effects of VDTs. "They may believe that visual displays cause backaches, even though the real problem is that they're not getting enough exercise. They may not be fully aware that reading at a new focal length causes some eye deficiencies to become more obvious; instead they think that visual displays cause headaches," he said.

The House subcommittee, chaired by Rep. Joseph M. Gaydos (D-Pa.), has held a series of hearings to examine labor complaints that VDTs can cause eye and back ailments and miscarriages.

Banks urged to protect EFT systems with encryption

Security should involve series of steps, including encryption or authentication

By James Connolly
CW Staff

BOSTON — Encryption, or an authentication process using encryption, should be key elements in a bank's electronic funds transfer (EFT) system, officials of Interactive Data Corp. told attendees at the firm's recent Bank Cash Managers Users' Conference here.

But those and other computer security precautions are only as reliable as the people who hold the keys — whether those keys are passwords or users' encryption keys — warned Interactive Data's vice-president for new technologies, Glenn Gustavson, and vice-president for TX/Microstation and TX/On-Site, Tom West.

Gustavson

"The user's participation is perhaps the most important part of the system," West said.

The speakers outlined some of the positive and negative features of various network and applications security procedures. West told the bank cash management officials that a password system is not secure unless the computer recognizes patterns of abuse, such as repeated attempts at access with improper passwords, and shuts down the system. He said another weakness is the tendency for some users to be careless with their secret passwords.

Gustavson said an answer-back system, where the computer allows access only when it calls the user at a prearranged number, is effective but expensive. A network of dedicated lines is expensive and subject to wiretapping.

Ely

He said applications controls include transaction sequence control, where the sending and receiving devices verify that all transactions were received in the proper order; and double-writing, in which the sender creates a duplicate data base to ensure prompt restart in case of an equipment failure.

Applications security can include passwords, test keys and multilevel function security, in which receipt of a message and release of funds are handled by separate officers. Gustavson noted that test keys are sometimes too predictable and that a user could penetrate multilevel function security by creating a phony second officer.

West

Gustavson and West said none of the security measures is adequate on its own. They suggested either of two processes using encryption and the U.S. Bureau of Standards Data Encryption Standard (DES).

A typical funds transfer might be encrypted by inputting the transfer message and the user's key into the DES device, which may be part of the terminal or a separate device, the speakers explained. The DES device would encrypt the message for transmission.

At the recipient mainframe, an operator would input the encrypted message and the original user key from a table of keys into another DES device that feeds the mainframe.

Gustavson described the second process, an authentication process that Interactive Data is testing for use with its Funds Transfer Service for banks and their customers. The authentication process involves transmitting the funds transfer message in plain text, along with an encrypted authentication code based on the user key. The recipient compares the authentication code with a code that he derives by using a table of keys and a DES device to detect tampering.

West's and Gustavson's discussions centered on a funds transfer system based on terminals, whether in the bank or at the bank customer's site.

Focus on confidentiality

Another panel member, Anne-Marie Ely, assistant vice-president of Marine Midland Bank in Buffalo, N.Y., said that an examination of such a transfer system by her bank's auditors focused on confidentiality and risk of loss.

"Our auditing department asked, 'What if someone gets into the system with a personal computer?' and we found it would be easier for them to get a form, type it out and slip it into a pile of transfers," she said.

Comparing a terminal-based system with traditional wire transfer systems, she added, "Most of the mistakes with wires lately have not been done with terminals, but with the Telex or an employee or a consultant."

SEC accuses Datapoint of violations

SAN ANTONIO — The Securities and Exchange Commission (SEC) last week charged Datapoint Corp. with overstating its sales by about $22 million and profits by about $5 million in fiscal 1981.

The SEC complaint filed in federal court here also charged Datapoint and a former vice-president, John V. Thornton, with violating several accounting and corporate disclosure regulations in misstating the company's financial status for the year ended July 31, 1981.

Datapoint consented to an order enjoining it from future violations of certain disclosure, internal controls, bookkeeping and record keeping provisions of federal securities laws. However, the company did not admit nor deny the allegations of the SEC complaint, which accused the company of filing false and misleading statements to its shareholders. The company said it consented to the judgment in order to avoid extensive commitment of time and financial resources.

The action terminated an investigation instituted by the SEC in May 1982.

During a break in the race, Ostar press files reports using a Wang system.

Press charts course of Ostar boats with personal computers

By John Desmond
CW Staff

NEWPORT, R.I. — During the early and middle stages of the 17-day 1984 Observer Singlehanded Transatlantic Race (Ostar), concluded last week, reporters covering the event from their Goat Island Marina press room here relied on microcomputers instead of personal observations for reports on boat positions.

The press was using reports from a Wang Laboratories, Inc. Professional Computer to determine where the 100 racing craft were and when they would arrive at the finish line at Brenton Reef Tower. When the sailors could finally be sighted by planes out of Newport, the press members returned to personal powers of observation, and the Wang micros took a backseat.

The Wang micros were receiving information from a European agency that was compiling data received by two satellites listening for signals sent out by transmitters aboard each of the 100 boats in the Ostar. It took two to three hours for the signals from the boats to reach their final destination.

The micros were generating five printed files of 168 characters in width and one display file for viewing on the monitor. The printed files yielded the positions of the boats racing, the boats not located, the positions of boats returning to shore, the boats that had arrived and the performance of the top 20 boats. The display file also listed the position of all the boats and their estimated time of arrival.

The two satellites receiving the signals were launched by Argos, a France-U.S. cooperative involved in worldwide environmental data collection.

The agencies cooperating in Argos are the U.S. National Aeronautics and Space Administration the National Oceanic and Atmospheric Administration (Noaa) and the French Centre National D'Etudes Spatiales (Cnes). Wang France and Wang UK were involved in receiving and transmitting signals as well.

The Argos Noaa-7 and Noaa-8 satellites, launched in October 1978, circle the earth in orbits of 521 to 546 miles high. Each completes its North-to-South-Pole revolution in 101 minutes, tracking transmitters within a 3,140-mile diameter.

Decoded signals

The signals from Ostar boats were decoded, stored in magnetic recorders on the satellites, then transferred to one of three earth stations: Gilmore Creek in Alaska, Wallops Island off the Virginia coast or Lannion in France.

From there, the data was sent to the National Environmental Satellite Data and Information Service at Suitland, Md., where information pertaining to the Ostar boats was separated from other data. The Ostar data was then sent to Cnes in Toulouse, France, where it was processed. From there, the data went to the Europe/1 center in Paris, where it was interpolated for correct position fixes received at different times. Finally, it was sent out to the Wang micros via an asynchronous communications package offered by Tymnet, Inc.'s data communications service.

Three reports were prepared daily and sent to Wang micros in London and Plymouth, England and in Newport, R.I., where the finish line was located. A Wang Professional Computer Model 005, with a 512K-byte memory, configured with a 10M-byte disk drive, 1,200 bit/sec modem and a 160 char./sec PC-PM016 printer, was receiving information in Newport. The press office was also equipped with Wang's World Language software, which operates in French, German, Italian, Dutch, English and Spanish.

NEWS

Managers point out obstacles to micro implementation

CW AT MICROFORUM '84

By Edward Warner
CW Staff

NEW YORK — What's the biggest hurdle to overcome in incorporating the microcomputer into a corporate office environment? That question, put to several computer managers attending the Microcomputer Managers Association's recent Microforum '84 here, elicited a variety of reponses, few of them the same.

Only two of the people interviewed by *Computerworld* at the conference had the same complaint. They said their biggest difficulty was wading through the flood of new products coming on the market.

"There's an explosion of products, both hardware and software," said Gene Maimin, who oversees a fleet of 51 IBM Personal Computers and Personal Computer XTs as project manager for microcomputer support for the New York office of Columbia Pictures. Maimin was echoed by Susan Zetscha, an internal microcomputer consultant for Metropolitan Life Insurance Co. of New York, who said, "You're playing catch-up [with the flood of new products]. You really can't control it."

Other users offered a variety of reasons why incorporating the microcomputer into their organizations is difficult. For Ronald Li, systems manager for the Montefiore Medical Center in Bronx, N.Y., the magic word is "communications." He wanted to secure the proper network because "the users group is demanding data from the host."

For Jean Chan of Morgan Guaranty Trust, a New York bank, the magic word is "security." She wanted to know how she could be sure the bank's micro files were secure.

For others, the concerns were more complex. William P. Lull, who operates a consulting firm in microcomputing, said his hurdles are twofold. The first is how to provide training that lets users think of the microcomputer as a tool for which they can determine their own applications. The second and thornier hurdle, he said, is how to impart this knowledge to older decision makers in a corporation.

Such employees, he noted, are apt to look on the microcomputer as "a word processing thing or something. This reduces its value to them." Lull said such executives are usually the major decision makers in a corporation and that asking them to attend a seminar or two will not work because it will force them into "admitting that they don't know this new technology."

Steven Machlis, whose responsibilities as a microcomputer consultant with Goldman, Sachs & Co. of New York include aiding the users of his firm's roughly 30 IBM Personal Computers, said Goldman Sachs' DP department is becoming a stumbling block to the spread of microcomputing. "Nobody wants to promote [the micro]," he said. "There are [already] too many machines out there."

A similar difficulty regarding the DP department, or at least other departments' attitudes toward DP, is a problem in the state of New Jersey's administrative departments, according to Bruce Rosser, bureau chief in the technical services department of the New Jersey Department of Transportation. Rosser said, "The greatest stumbling block [to integrating the microcomputer] is the hatred people feel for DP. They can't stand us, and we think they're a bunch of dummies."

As a result, "creative purchase orders" are sometimes written by other state departments to acquire microcomputers, some of which cannot be networked with the rest of those owned by the state. And, Rosser added, "Once they have them, they don't want to talk to us."

Speaker urges broader role for micros in corporate arena

CW AT MICROFORUM '84

By Edward Warner
CW Staff

NEW YORK — Consultant and MIT professor Dr. Michael Hammer challenged a group of approximately 120 microcomputer managers here this month to stop using the microcomputer for nothing more than word processing and spreadsheets and to use it instead to transform their businesses.

For an example of how microcomputers can transform a business, Hammer pointed to the McKesson Corp. of California, which used the power of personal computers to change from being simply a drug distributor to "the largest processor of [pharmaceutical] insurance claims in the country."

CW photo by E. Warner
Hammer

That transformation occurred because McKesson was able to see ways in which the microcomputer could be used for something more than automating inhouse tasks such as order entry or word processing, according to Hammer.

It leased personal computers to its pharmacist customers throughout California so the druggists could order products directly from McKesson and, if they wished, transmit to McKesson the data on insurance claim forms.

The claim forms had been flooding the pharmacists' offices, and when McKesson took them off the druggists' hands for a 5% commission on each claim, the company widened its scope and profits.

Such feats as McKesson's are now possible for most businesses; the cost of processing power is no longer a roadblock to their happening, Hammer said, owner of the Cambridge, Mass., consulting firm Hammer & Co., who made his remarks at the opening of Microforum '84, the national conference of the Microcomputer Managers Association. "Within a year," he predicted, "You're going to be able to put an [IBM 370/158] on a desk in terms of processing power."

The real roadblock to making the transformational step in a firm is an attitudinal one, he argued. "The age of expensive and complex computing is gone and ain't never comin' back. [But] we haven't changed." Instead, most computer professionals still think about personal computers in mainframe terms, and the applications that those machines take on are traditional office automation tasks.

Even if a firm feels unsure about undertaking a McKesson-style business transformation, Hammer said, the microcomputer should at least be employed to make what he called functional enhancements in the firm's way of doing business. Such an enhancement, he explained, would be one where the microcomputer would be used to help a company "buy smarter" by putting into its data base all the data from the firm's purchasing department.

Micro vendors told to increase, upgrade support

CW AT MICROFORUM '84

By Edward Warner
CW Staff

NEW YORK — Ask the microcomputer manager — that new breed of specialist integrating the personal computer into a corporation — what he wants from hardware and software vendors, and he is likely to respond, "Better communication."

That was the assessment of a panel of six microcomputer managers, all from Fortune 500 firms, who spoke out in a presentation at Microforum '84, a conference held here this month by the Microcomputer Managers Association of 130 microcomputer managers.

Whether it be via better manuals, better user training or, as one microcomputer manager suggested, via a toll-free help line, the panelists declared their need for more information about the microcomputer products they buy.

Short on specifics

Even product advertising was knocked by one panelist as too short on specifics. That panelist urged that each advertisement be accompanied by a toll-free number that interested readers could call for more details.

It was product documentation, though, that took the greatest number of knocks from the panelists. Ion Amariuta, national DP manager for Coopers & Lybrand accountants, charged that 35% of all his department's manuals have errors regarding the products. That, he said, can spell trouble for an office where the network of personal computers and peripherals is constantly being reconfigured.

Marcia Hearst, information center manager for Metropolitan Life Insurance Co., meanwhile, knocked the continual listing of changes made by vendors in documentation, saying, "I don't want my users to wade through three books of changes." All manuals should state the resource requirements of the software, provide step-by-step installation instructions and have a complete index, she said, noting that only one manual she ever encountered showed users how to load a diskette.

Another panelist, Bud McKennon, director of finance and administration for the NBC television network, called on vendors to supply more manuals with each microcomputer because of the greater number of users in an office than in a home.

McKennon, who, until his recent promotion, was responsible for managing NBC's 13 New York office microcomputers, said vendors should provide a toll-free number with their products and bundle the price of that service into their charges.

Better training and support

Several of the panelists also called for better training and support from vendors. "Training and support has got to be the key reason I would support your [software] in my organization," Virginia Talamo of Price Waterhouse & Co. in New York told vendors. An area of training that she said is often neglected by vendors is that of "training for the trainer" — the person who will actually teach the organization's users. Providing those people with instructor's manuals would be of particular help, she observed.

Talamo also called for on-line tutorials containing specific modules directed toward the user's industry. "My executives," she said, "don't want to see the ice cream shop [used as an example] in their tutorials. They think it's infantile."

As for the products themselves, panelist Hearst called for more software with the capacity to upload and download data to a mainframe and that can share data with other programs. "We've almost decided to stop supporting a product because there was no migration path upwards," she noted.

McKennon, meanwhile, urged the spread of multiuser systems, noting that six of NBC's New York microcomputers were configured in multiuser systems that provided access from 48 workstations. Buying a personal computer for each worker's desktop "costs too much," McKennon said. Besides, each office is better served by having its data base centrally stored on the office multiuser microcomputer.

Dennis Rodrigues, systems manager in the office automation department of Merrill, Lynch, Pierce, Fenner & Smith, Inc., meanwhile, called on vendors to "take your cue from the mainframe manufacturers" and provide a one-time licensing charge for use of a program, rather than selling each diskette separately. It was Rodriguez who suggested a toll-free number to give specifics on advertised products.

Panelist Hannah Blank, vice-president of Chase Manhattan Bank, advised vendors to get to know the means by which each of their clients is integrating the micro and then direct their pitches to the proper individuals in each scheme. Some corporations, Blank explained, have microcomputer managers, others "have scores of users doing their own thing."

The best way to reduce stress? Good management

STRESS
Part 3

By Dr. Paul E. Greenfield
And Larry Raskin
Last article in a three-part series.

In the fast-paced, highly competitive computer industry, excessive stress can sharply reduce individual and organizational performance. In our first two articles, we identified six categories for assessing work-related stress: ambiguity, conflict, overload, change, responsibility and physical environment.

We also described the messages that signify excessive stress levels. These include organizational messages, such as high turnover and absenteeism; interpersonal messages, such as argumentativeness or withdrawal; and personal messages, such as chronic illness or depression.

Identifying stress levels is the first step toward reducing their harmful effects. "My responsibility is to manage the business," said an executive in a software company. "This also includes improving organizational health."

Studies have shown that every dollar invested in employees' physical and mental well-being saves $3 in productivity. In fact, American business would save over $10 billion per year if stress-related costs were reduced by half.

Many companies are paying closer attention to stress. They are finding that their employees remain loyal longer and produce more when the company promotes personal and organizational health.

The basics

The best stress reducer is good management. Employees who are poorly managed are more likely to suffer from excessive stress. In the DP shop, employees with technical abilities are often promoted to supervisory positions. Some lack the management skills to be successful in their new responsibilities.

Supervisors and managers reduce stress when they listen well, set clear expectations, appraise performance fairly, involve employees in solving problems and make sound business decisions. You can reduce stress by making sure those in responsible positions receive the coaching or training they need to be successful.

Senior managers set the tone in any organization. You can give stress reduction a higher priority in a number of ways. Put "stress" on the agenda of your next senior staff meeting. Encourage managers to spend time in MBWA — management by walking around. Have them pay attention to such stress messages as the level of interpersonal conflict and changes in employees' behavior. Collect data about turnover rates, productivity levels, absenteeism and medical claims. Enroll yourself in a stress management workshop.

Policies, programs

Companies use a wide variety of approaches to reduce excessive stress and promote health. These include:

- Establishing flextime so that employees can adjust their hours to work when they are most productive, allowing them to manage career and family responsibilities better.
- Creating healthier work environments by looking critically at physical surroundings, changing lighting, reducing noise, maintaining a constant temperature, setting aside quiet places and quiet times and providing healthier foods in cafeteria vending machines.
- Educating employees about stress and health by publishing articles in newsletters and distributing literature from local health care agencies; developing the personnel department as a resource.
- Providing training in stress management and time management by qualified consultants.
- Screening for high blood pressure, weight problems, stress symptoms.
- Encouraging physical exercise by teams, groups and individuals; sponsoring leagues and recreational events; providing showers and lockers; contracting with health clubs for reduced membership fees.
- Developing in-house facilities, including exercise rooms, volleyball courts and so on.
- Establishing employee assistance programs for counseling in alcohol and drug abuse and for referrals for more extensive treatment.

Personal health

Medical experts have identified three key areas that will help you reduce stress and maintain optimal health.

Exercise. Improve your cardiovascular system with an aerobic-type routine at least three times per week.

See STRESS page 24

Greenfield and Raskin are consultants with Stress Management Consultants, Inc. in Cambridge, Mass. Greenfield is also a psychotherapist in private practice and Raskin is a senior training specialist with Automatic Data Processing, Inc. in Waltham, Mass.

"Rockwell International eliminates order management paperwork and ships products faster with a Tandem NonStop® Computer System."

[redacted]

Our Tandem NonStop computer helps us dramatically streamline order tracking for our broad line of products here at the Collins avionics facilities in Cedar Rapids. This automated operation has meant we've been able to ship our products faster as well as respond to customer inquiries in a much more timely, accurate fashion.

The Tandem system consolidates all data pertaining to the orders from order entry to scheduling, inventory, to packing lists and right on down the line to shipping. And because the system is on-line, other departments have immediate access to this information as well. Accounting, for example, now generates invoices automatically, resulting in much improved cash flow. Manufacturing is saving $175,000 a year in internal freight charges due to the reorganization of ordering and shipping procedures; and the Group as a whole has been able to eliminate more than 300,000 reproduced documents a year.

Other system benefits contributing to our improved customer service include better control of backorders, more accurate pricing information, and the ability to make detailed forecasts of market conditions for planning purposes. The net result is an operation that is helping us achieve some very significant gains in plant productivity.

The NonStop System. Ideally suited to on-line transaction processing where continuous availability of up-to-the-second information is critical to your business.

Vendor panel addresses future trends in software

By Paul Gillin
CW Staff

CHICAGO — Will applications programming become a thing of the past? What is integration? What kinds of management changes do companies have to make to meet new data processing requirements? And just what is IBM's software strategy?

Those were some of the topical questions addressed by top executives from six major software companies during a panel discussion held here recently at the Information Management Exposition & Conference for Software (Info/Software).

Despite the diversity of companies represented, the panelists showed surprising unanimity on many topics. They generally agreed that DP has to reorient itself to face a coming explosion in end-user computing, that confusion regarding some terminology is largely the fault of the vendors themselves and that IBM is likely to assume a much more aggressive software posture in the future.

The panelists included John Landry, vice-president of research and development at McCormack & Dodge Corp.; Frank Chisholm, executive vice-president of Cullinet Software, Inc.; Bruce Coleman, president of Informatics General Corp.; Martin A. Goetz, president of Applied Data Research, Inc.; Dennis Vohs, vice-president of research and development at Management Science America, Inc.; and Thomas Nies, president of Cincom Systems, Inc.

On the future role of applications programmers, most panelists agreed that the job will not go away, but will change markedly. "The advent of query languages will reduce the need for applications to be built," Vohs said. "Today, many applications are written simply to get a piece of data out of the computer."

Emergence of a hybrid

The result of the move to end-user computing will be the emergence of a "cross-breed between a programmer and a user," Landry added. "We call them 'applications specialists,' and we see that job blossoming."

Coleman noted that due to the complexity of many applications, companies are finding it easier to change the way they do business rather than the software. "As applications become more mature, we'll see more time spent on defining the business rather than changing the software," he said.

Asked to define the term "integration," most of the panelists agreed that vendors have contributed to the confusion surrounding the word. "There are all types and levels of integration, and everybody says they have it," Chisholm said.

Nies noted wryly that vendors have kept the definition obscure as a marketing tactic. He encouraged users to create their own definitions of integration and measure vendors by those standards.

Vohs defined integrated software as having "common functions, common elements and common communications so you don't have to turn one application off to go to another." Chisholm said the key to both vertical and horizontal integration is that "one piece [of the software] is expecting the other piece to be there."

Prompted to suggest changes that organizations should make to cope with changing DP environments, the panelists concurred that the drift is inexorably toward user computing. DP has to begin to control that change before it gets out of hand.

"In the long run, DP should control all applications," Goetz stated. If DP fails to take control, the proliferation of languages and tools in the user community will lead to "chaos," he said.

Other panelists asserted that it is becoming crucial for businesses to define their strategies better before developing a DP plan. "The business of data processing is different from the user business," Vohs said. "Users have to define their requirements to be sure their goals are being met by DP."

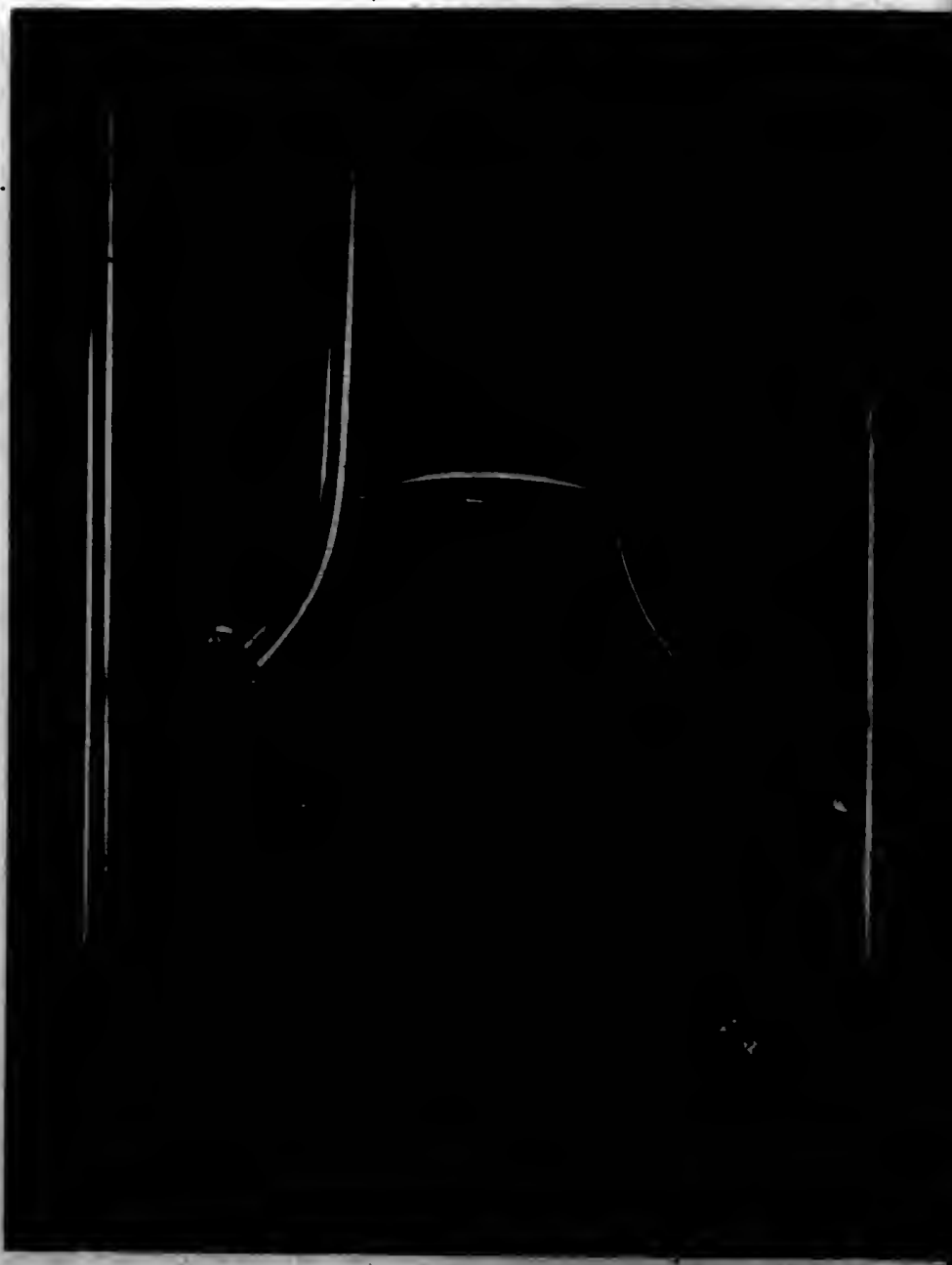
While the representatives agreed that IBM is aiming to grab a piece of the software market, they differed on how traumatic that move would be. Nies maintained that "by the end of the decade, IBM will take away the data base management system [DBMS] market by putting it on a chip," probably in a forthcoming mainframe announcement.

Landry stated that IBM's DB2 DBMS "will be the production data base environment of the future" and will be tied more closely into IBM's 3270 Personal Computer for a micro-mainframe link.

But Chisholm disagreed with Nies, claiming that microcoding of a DBMS would be a major risk for IBM. "Who'll put a million lines of code on a chip, knowing that one bug could be disastrous?" he asked. Chisholm predicted that IBM will microcode standard routines, such as I/O procedures, and leave the DBMS market essentially open.

Vohs said a stronger IBM software presence would be a benefit to independent companies and users by providing a de facto standard. "That allows us to build safely on a standard environment," he said.

However, he admitted that IBM's immense sales force could allow the computer giant to gut the low-end market.



Micro-mainframe links a hot topic at two shows

By John Gallant
CW Staff

CHICAGO — Much has been promised of them, yet most currently available microcomputer-to-mainframe links fall far short of user expectations.

While frustrating, that situation has hardly dampened interest in the subject. Micro-mainframe links remain a hot topic, judging at least by attendance at sessions held at both the Information Management Conference & Exposition for Software (Info/Software) and Advanced Manufacturing Systems (AMS) conference held here earlier this month.

While manufacturing managers at the AMS micro-mainframe session were being told that link technology would transform micro workstations into valuable productivity centers, Info/Software session participants were advised to take the plunge. That message came from speaker John Crocker, executive vice-president of On-Line Software International, Inc.

Crocker said management information systems professionals and end users must begin experimenting with the micro-mainframe products already offered. "The technology is still in its infancy," he said, "but don't wait around for the perfect solution. Educate yourself to what is available and try to match that technology to your present needs. In addition, keep micro-mainframe links in mind while you are building applications."

In reviewing the state of link technology, Crocker said the variety of micro-mainframe products available fall into four basic groups. The simplest links either provide basic terminal emulation capabilities or enable simple file transfer between the micro and mainframe. More advanced products allow end users selective access to mainframe data, and the fourth class of links provides bidirectional data transmission between the systems.

Crocker noted that currently available links are also divided between those with proprietary and open architectures. The proprietary links offer only data transfer to and from a particular vendor's micro or mainframe data base management system or applications. In contrast, the open architecture links provide for transfer between a variety of DBMS and applications.

Contrary to prevailing wisdom, Crocker said, the linking of micros to mainstream information systems is likely to increase rather than reduce mainframe processing loads. In addition, he warned, micro-mainframe links could have a serious impact on existing communications networks, which may not be designed to handle the volume of data transmission required by link users.

Crocker also said that data access security will pose a double-edged problem for MIS professionals. Micro-mainframe links increase the risk of security breach, yet overly restrictive protection systems could frustrate and users with legitimate claims on corporate data.

'The dark side'

That theme was echoed by Thom-

See MICRO page 24

MICRO from page 23

as O'Flaherty, director of software programs at Input, Inc., who said that security is a missing link in connectivity software. Offering insight into what he labeled the "dark side of micro-mainframe links," O'Flaherty said that overoptimism, based on unfulfilled promises, abounds among users and vendors.

He urged management to take a "corporate view" of micro-mainframe link technology. A link should be adopted only if it solves business problems, he said.

In addition, a solid foundation of trust is a necessary precondition for the successful implementation of such a link. O'Flaherty said the link must be part of the organization's "optimization hierarchy," fulfilling first the requirements of the corporation and its departments and finally the personal needs of its end users.

LINKS from page 23

mainframe data that could be maintained and manipulated on the micro. In some instances, according to Hamilton, the workstation information would later be uploaded for inclusion in applications that are processed on the mainframe.

The nature of the applications to be performed at the micro workstation is the most important factor in the selection of a micro-mainframe link, according to Hamilton. In reviewing the applications requirements, he said, a user should consider:

■ Whether ad hoc query capabilities are required. — Is the downloading of predefined mainframe data sufficient, or does the application require summarized or calculated data that can only be accessed through ad hoc query capabilities?

■ The volume of mainframe data to be downloaded and uploaded. — How much data will the link package have to transmit?

■ Response time. — How quickly must the data be downloaded or uploaded to the mainframe?

■ The degree of data summarization needed. — To what extent will mainframe resources be utilized to summarize production data for use in the micro workstation application? The summarization of manufacturing data can often require a good deal of DP involvement.

■ Uploading requirements. — Will data processed at the micro level be uploaded to the production data base? Should the link provide uploading to live production data or to some type of buffer data base?

■ Data sensitivity. — Will the workstation application access sensitive data on the mainframe? If so, does the link offer security capabilities to limit access to authorized users?

STRESS from page 19

for 20 minutes. Check with a physician before undertaking any strenuous exercise. To start, take a brisk walk after work.

Nutrition. Eat a balanced diet with reduced intake of cholesterol from fatty meats, oils and dairy products; reduce salt, sugar and caffeine; eat more fresh fruits, vegetables and whole grains. Have an apple instead of a sweet roll. Substitute juice for your mid-morning cup of coffee.

Relaxation. Take several short mental health breaks during the day. Five minutes of quiet time can make you 30 minutes more productive. Stretch at your desk; try to leave work at work by sitting quietly or going for a short walk. Take your vacation this year.

For deeper relaxation, try meditation, imagery training, progressive relaxation or yoga. To reduce anxiety and muscle tension, also investigate the various forms of biofeedback. Get advice from your physician, clergyman or mental health professional if you need it.

For a bibliography on stress management and a list of resources, send a self-addressed, stamped envelope to Stress Management Consultants, 23 Longfellow Road, Cambridge, Mass. 02138.

Cullinet: I'd like both.

☐ Please send me more information about IDMS/R
☐ Please have a Cullinet representative call on me
☐ I'd like to attend a seminar in _____ (CITY) on _____ (DATE)

Bloomington, IL.. June 26	Indianapolis, IN... July 10	Oakland, CA..... June 26
Cedar Rapids, IA. June 26	Kansas City, MO. June 28	Salt Lake
Cincinnati, OH.... July 18	Lexington, KY... June 27	City, UT..... June 27
Cleveland, OH.... July 11	Los Angeles, CA.. June 28	Ventura, CA..... June 26
Columbus, OH... June 27	New York, NY .... July 24	Washington, DC.. June 28
Ft. Wayne, IN .... July 11	Oakbrook, IL..... July 12	

Name/Title _____

Company/Department _____

Address _____

City/State/Zip _____

Telephone _____

CW 6/25

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 423 NORWOOD, MA 02062

POSTAGE WILL BE PAID BY ADDRESSEE

Cullinet Software, Inc.
Attention: Marketing Communications
400 Blue Hill Drive
Westwood, MA 02090-9973

For the 4300 user prepared to sacrifice performance for ease of use in a relational dbms, two little words:

You're in a tough position.

You've got management telling you they want the system up and running *yesterday*. And you've got a small technical staff that simply doesn't have the time to learn complex new skills.

So it's no surprise that your inclination is to settle for something less in your choice of databases.

In response, we have just one word of advice: *don't*. With Cullinet's new relational database, IDMS/R, you can have the best of both worlds – ease of use *and* performance – from the acknowledged leader in database management software.

IDMS/R is a powerful relational database that greatly reduces the time it takes to develop applications. Its facilities are so simple to use, your end users can develop applications without intervention from your data processing staff. All they have to do is define a relational record, and IDMS/R does the rest.

IDMS/R is also extremely flexible. It's a system that *anticipates* change by providing for the dynamic definition and redefinition of your relational database.

You'll also appreciate the fact that IDMS/R conserves your finite data processing resources. With a feature called "Relational Fastpath," you can tune the database and thus benefit from a dramatic boost in performance. It's this feature, in particular, that makes IDMS/R a high performance relational dbms.

And while the product itself has so much to recommend it, we'd be remiss if we failed to point out what our more than seven hundred 4300 users already know – namely, that it comes with the level of service and support Cullinet is noted for. Educational training, technical support, even a 24-hour hotline.

To find out more about IDMS/R, the database that combines high performance and ease of use, contact Cullinet.

The company that doesn't ask you to make sacrifices.

I'd like both. CW425

Name/Title _____

Company/Department _____

Address _____

City/State/Zip _____

Phone _____

Send to: Cullinet Software, 400 Blue Hill Drive, Westwood, MA 02090-2196

Database: Cullinet

Somebody has to be better than everybody else.

It's inevitable.

Somebody is always more determined. Works harder. And winds up on top.

Take Dysan, for instance.

We were the ones who helped develop the first 5¼" flexible diskette.

And while everybody else was trying to figure out how to make them, we were busy making them better.

With superior materials. A special lubricant and jacket liner that extend diskette life.

Unique manufacturing techniques. Like our burnishing process that helps eliminate read/write errors.

And an almost fanatical corporate commitment to quality.

What does all this mean to you?

Every Dysan diskette you buy will record and retain all your data all the time. For as long as you own the diskette and treat it right.

Dysan.

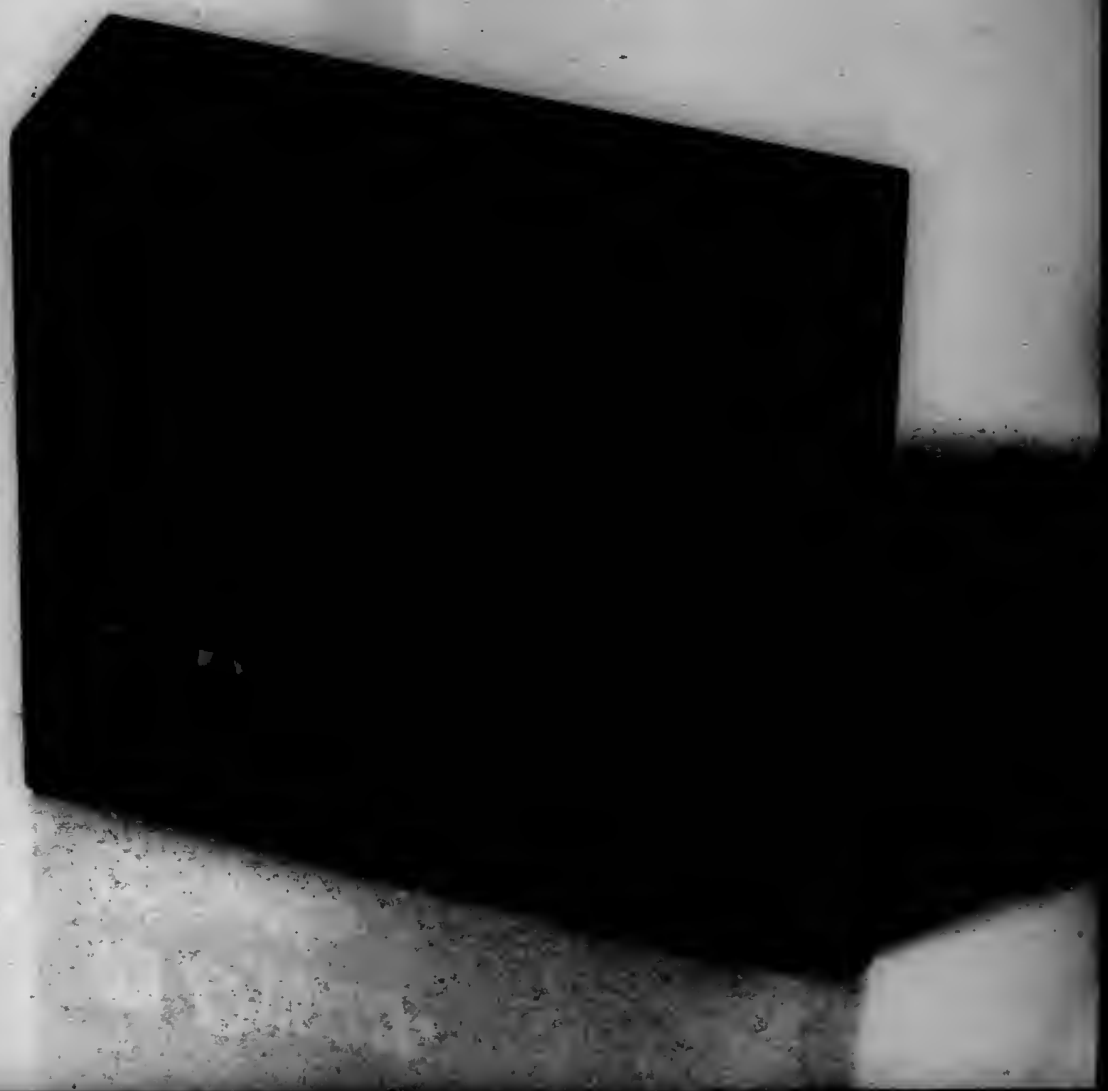
We're not just like everybody else.

Dysan 5¼" and 8" flexible diskettes are available at your computer products dealer.

Call toll free for the name of the Dysan dealer nearest you. (800) 551-9000.

Dysan Corporation, 5201 Patrick Henry Drive, P.O. Box 58053, Santa Clara, CA 95050, (408) 988-3472.

Dysan®



U.S. firms dissatisfied with federal data on resources

By Robert Batt
CW West Coast Bureau

WASHINGTON, D.C. — Corporate America's need for timely international data concerning natural resources and the environment is not being adequately met by the federal government's network of information systems, a newly published report has found.

"Corporate Use of Information Regarding Natural Resources and Environmental Quality," from the Council on Environmental Quality (CEQ), said major U.S. corporations are not satisfied with the government's computer-based natural resource forecasting and feel its information is often out-of-date.

While the government has well-maintained data bases that corporations use, it does not report as much information as many companies would like about market demand for natural resources, including demographic data, renewable energy, mineral resources and land use, the report said.

"Operating conditions are changing, and corporate information needs are evolving faster than our decentralized information network can respond. Drastically quicker release of federal government data [is] a most pressing corporate need," the CEQ reported.

The 72-page report is based on interviews conducted with 229 information users at 46 of America's largest corporations, trade associations and private information companies. Organizations taking part in the study included American Express Co., Hewlett-Packard Co., Standard Oil Co. of California, Exxon Corp. and Boeing Co.

While the federal government is regarded as the primary source of information on international natural resources and its data critical to corporate strategic planning, market research and resource acquisition, there is a serious question concerning the accessibility of government data to private organizations.

According to the report, one manager of information services at 3M Corp. observed, "The primary problem with locating government sources is that there is no single, reliable, comprehensive index of all government publications."

To rectify these perceived deficiencies, the CEQ recommends a number of new approaches, including the creation of an index of government resource information, the setting up of a clearinghouse for international natural resource information and the release of more timely information by making it available to interested users in electronic form.

"Because the government's data base covers so many topics, corporate analysts rely on it. A combination of early release and electronic transfer would vastly improve the timeliness of government data. Information in prepublication electronic form, such as photocomposition tapes, offers a technological solution," the CEQ asserted.

Information contained in the data base, the report concluded, should be standardized whenever possible in order to make it comparable from one country to another. The resulting consistency will be crucial to the ultimate usefulness of the data base, it said.

Info center conference set for August

BOSTON — The Information Center Conference and Exposition, directed at planners and managers of information centers in business, industry and government, is scheduled to take place Aug. 26-30 at the Sheraton Boston Hotel and Hynes Auditorium here.

Sponsored by Warren/Weingarten, Inc. of Boston, the conference will include 60 sessions and will feature individual speakers and panel discussions, product demonstrations and more than 100 exhibits, according to the sponsor.

Two keynote speakers will address the conference. Dr. Michael Hammer, founder and president of Hammer and Co. and associate professor of computer science at MIT, will discuss "A Strategic View of Corporate Computing," concerning the blurring of the distinction between data processing and personal computing.

Dr. Larry Harris, founder and president of Artificial Intelligence Corp., will speak on "Artificial Intelligence in the Information Center," addressing whether artificial intelligence systems may reduce the need for training and how natural language software and expert systems will affect end users.

Registration for the entire conference is $470 prior to Aug. 13 and $520 afterwards, the conference sponsor said.

Single-day registration is also available.

More information is available from Nancy J. Weingarten, Warren/Weingarten, 38 Chauncy St., Boston, Mass. 02111.

TURNAROUND TIME

Larry Long

Q I am the data processing manager of a small manufacturing company. While I've worked here, we have gone from no computer to an IBM System/36. Most of the standard business systems are automated. For a number of years, we have been looking into putting computers in our six plants, but have not done so because the cost is prohibitive.

Our president and vice-president of manufacturing attended a recent trade show where they saw many computer wonders.

Shortly after returning, they invited a consultant who had worked with us in the past to demonstrate his micro programs, which they had seen at the show.

Soon afterwards they made the decision to install [IBM Personal Computer XTs] in our plants and purchase one of the consultant's programs. The vice-president of manufacturing appointed an engineer he had just hired from his old company to install this program in the plants.

I was asked to review the consultant's other programs. I did so and recommended that we not purchase them.

They are difficult to use, too expensive and have many duplicate files that require maintenance. Moreover, they require too many changes to our operations, and there is no data security.

Against my recommendation, management decided to go ahead and purchase the programs. They also are to be installed by the recently hired engineer.

Our personnel director tells me that I shouldn't be upset: They have a right to run their departments the way they choose.

I feel that my part of the "team" is being lopped off. What do you think?

In theory, MIS professionals want to encourage members of their user community to help themselves. Also, in theory, the user has readily available technical advice in the MIS department.

Sometimes users go too far in their pursuit of technological self-sufficiency and, sadly, ignore the advice of MIS personnel.

I cannot determine whether management made the right decisions from the information you have provided. Maybe the positives actually outweigh these seemingly project-killing negatives. Or, perhaps, management was hypnotized by a slick demo and promises of a solution to all problems.

I am familiar with the outcome of many situations like yours. Based on these observations, I would say that the top management overgride of an MIS manager's well-thought-out recommendations has proven to be a mistake at least 80% of the time.

If you feel strongly that their decision is misguided, do two things. First, articulate to top management (in terms they can understand) exactly why the decision to go with the IBM XTs and the manufacturing software is wrong. Then give them at least one viable alternative.

Q Like many members of the so-called "B.C. generation," I have entered the world of computers through the back door. I am employed as a college administrator and make use of computers in strategic planning. In addition, I have taught adult evening college classes in Basic programming and software applications. How does the professional MIS world view such non-specialists? Can users such as I hope to make contributions to the MIS field?

The trend in MIS is to help users help themselves. MIS professionals appreciate your contributions, but with a growing backlog and the availability of user-friendly software, they are beginning to expect users to pull their share of the load. You are doing your share but, in general, end users at all levels need to become more active participants in MIS activities, especially those that affect them directly.

Q I'm experiencing great difficulty in locating a job. My six years of operator experience have become as obsolete as the systems I work on. I rarely get to fill out an application because I don't have IBM 4300 or 30 series experience.

Also, my supervisor is badmouthing me. We have a great personality conflict that can't be resolved — I have tried for three miserable years. At one time we were both at the same level, but to my dismay, she was promoted to the supervisor position. Now she likes to exert power without justice and is slowly trying to work me out by cutting responsibilities and lines of communication.

Also, she threw me onto the third shift. I'm only making $15,500. How do I get out of here?

No $15,500 job is worth this kind of frustration. Perhaps you are not looking in the right place. Not everyone uses IBM hardware.

Experienced operators accepting employment in non-IBM shops rarely have experience on similar computer systems. I would suggest that you expand your search to non-IBM shops and smaller installations (IBM and non-IBM).

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

Brown proposes nationwide computer education plan

By David Myers
CW New York Bureau

NEW YORK — Former Calif. Gov. Edmund G. Brown Jr. has proposed a nationwide scheme to improve computer education in the public schools, including the establishment of five regional "centers of excellence" to study the relationship between computers and human learning.

Speaking at a recent daylong forum here on the "Human Side of Personal Computing" sponsored by Hayden Publishing Co., Brown unveiled a proposal to award public schools in each of the 50 states matching grants from the federal government to set up pilot programs in computer education for all students.

Now head of the bipartisan National Commission on Industrial Innovation, Brown told reporters that increasing the skill level among the nation's students "is the key to restoring our position in the world. The U.S. is not producing the learning and talent necessary to maintain our competitive advantage."

Under the Brown proposal, the centers of excellence would be established in five different regions of the country to undertake what the one-time presidential candidate and two-term Democratic governor called "qualitative research" into the long-range effect of computers on cognitive learning. The research centers would be staffed by computer engineers, educators, psychologists and social scientists.

Nationwide program

For more immediate results, Brown said he would propose to Congress "a nationwide program of model schools for the intensive use of computers."

Under Brown's proposal, a number of schools in each state would be awarded one computer per child, based on an educational plan submitted in open competition with the state's other schools.

Brown said the proposal would be introduced in Congress next year and would call for the awarding of matching federal and state grants. He admitted it would not reach the goal of having a computer available to every U.S. schoolchild, but said it would "elicit concrete thinking about how to use computers in the schools" and would help settle "the growing unease about unequal distribution" of personal computers among U.S. schoolchildren.

Responding to the growing perception that public education in the U.S. trails that in Japan, Brown said the Japanese are characterized by "a relentless desire to collect more and more information." Only by having computers available to them at school can American children be instilled with a similar desire, Brown maintained.

Until now, the four roadblocks to computers in the schools, according to Brown, have been a lack of teacher training, inertia in the U.S. system of public instruction, the high cost of computer hardware and the unavailability of good educational software. While computer prices have begun to come down, the other three obstacles remain, he said.

College tries computer camp for girls only

COLUMBIA, Mo. — Are boys more adept at using computers than girls? Stephens College here thinks they are. In an attempt to balance the scales, the school is experimenting with computer camps for girls only.

Dr. Markita Price, head of academic computing at the college, said the popularity of video games among junior high school boys gives them an edge when it comes to learning how to run computer systems. Consequently, when placed in coeducational computer camps, the boys tend to learn faster, are more competitive and dominate the available computer systems.

According to national averages, boys attending computer camps outnumber girls by a 3:1 ratio, Price said, so Stephens College decided to experiment with a week-long camp for girls only earlier this month. Like many coeducational camps, the Stephens camps offered roughly six hours a day of computer instruction and six hours of other activities.

Women in computing

The only difference in the girls-only camp, Price said, is that it places a slightly greater emphasis on women in computing. Price added that the computer games used in the girls-only camps tend to be less violent than those used in coeducational camps.

Stephens College has offered the girls-only computer camps during the past two weeks, attracting 21 and 22 attendees, respectively.

The school plans to repeat the girls-only camps next year. The camps use mostly Apple Computer, Inc. Apple IIe and Apple IIc microcomputers, but IBM Personal Computers and Radio Shack TRS-80 Model 4 micros are also used.

Forum hears good news, bad news about micros

By David Myers
CW New York Bureau

NEW YORK — According to experts, people have been telling each other and themselves unwitting lies about personal computers.

Personal computers do not resemble the human mind.

They will not make one's job more interesting or boost one's productivity.

They cannot magically transform a disorganized worker into a model of neatness.

That was the bad news that came out of an all-day forum here on "The Human Side of Personal Computing" sponsored by the Hayden Publishing Co. earlier this month. The good news is that computers do help entrepreneurs get ahead, provide men and women with the option of working independently and raise the level of people's expectations of what they are capable of achieving.

"You know the three great lies of man. Here are the two great lies of personal computers: 'This will make your job more interesting' and 'It will increase your productivity,' " said management consultant Matthew J. Puleo of Yankelovich, Skelly and White. In fact, personal computers on the job in America are used mainly for clerical tasks, he said.

Upper management within U.S. corporations often resists personal computers because the machines "do away with some external signs of success, such as having your own secretary," Puleo observed.

And as for productivity gains, Puleo said a desktop personal computer "may make you more effective, it may make you better, but not necessarily faster. The jury is still out on [productivity gains]."

Other speakers at the forum agreed with Puleo that seeking gains in productivity from desktop micros is asking the wrong thing from the machines.

Dr. Richard B. Byrne, a private consultant and professor of communications at the University of Southern California, said the important thing about personal computers is that they carve out new ways for men and women to work, to be creative. "It's not the old work, it's the new work [that personal computers promise to transform]. The reason productivity gains have been so small is that we're automating the industrial revolution electronically." Byrne added that bringing personal computers into an organization has the same effect as history's first four-minute mile; it raises the level of expectations. "A personal computer is like an amplifier in a stereo system — it makes you whatever you are, but more so."

Byrne described computer use as ascending upward in three levels, starting with users who view a personal computer as merely a machine. "They are primarily concerned with getting it to run," Byrne explained.

Users then rise to the level of employing the computer as a tool or an appliance, then finally to the level of playing it like a musical instrument. "You want to get the box to enhance your individuality. When a great pianist plays, you hear the spirit of the musician. You don't come up to him and say 'What a great piano! How many K does it have?' " Byrne said.

Byrne's statement echoed an earlier remark by Puleo, who said that the real promise of personal computers lies in their freeing people to "work outside of the system, to do their 'what ifs' on their own."

But the best computer users in an organization are those who understand that a personal computer gives them a competitive advantage, Puleo said. Installing desktop computers often transforms a firm's best and brightest workers into in-house entrepreneurs. "They understand technological change well enough to use it to get ahead," Puleo explained.

Entrepreneurship is what characterizes the microcomputer industry, according to Wall Street analyst Michele S. Preston of L.F. Rothschild, Unterberg, Towbin.

She cited the following people as the leading entrepreneurs in the micro business: Apple Computer, Inc.'s Steve Jobs and John Scully; Microsoft, Inc.'s Bill Gates; Software Arts, Inc.'s Daniel Bricklin; Visicorp's Dan Fylstra; Lotus Development Corp.'s Mitchell Kapor; the IBM Entry Systems Division's Don Estridge; and Compaq Computer Corp.'s Rod Canion.

Three qualities stand out in computer entrepreneurs, Preston said. They have a consuming dream of making an impact on the world, they seek out risks and they are "willing to commit 200% of their time" to their ventures.

However, to be successful, Preston said, the computer entrepreneur "must be successful at meeting the second challenge. That's the real key to the successful entrepreneur: the ability to do it again."

On the topic of whether computers bear any resemblance to the workings of the human mind, Dr. William R. Hobbs, a professor of behavioral medicine and psychiatry at the University of Virginia, said that computers only duplicate "the secondary processes of the mind, the conscious sequential thinking."

Unlike the human mind, the computer is incapable of instantaneous recognition," he said.

Federal DPers to hold meet

WASHINGTON, D.C. — Managing changes in computer technology and concepts will be the theme of the Sept. 5-7 meeting of the Federation of Government Information Processing Councils at the Sheraton Washington Hotel here.

The federation, composed of 17 data processing and telecommunications users groups, reported that nearly 30 speakers and workshop leaders from industry, the federal government, academia and the legislative branch of government will participate.

Scheduled speakers include AT&T Information Systems, Inc. Chairman Charles Marshall, U.S. Rep. Frank Horton of New York, U.S. Rep. Ed Zschau of California, Acting Administrator of the General Services Administration Ray Kline and Thomas Wilmott, director of user research and service for International Data Corp.

Topics are expected to include computef systems security, local-area networking, increasing productivity, use of microcomputers for audit purposes, supercomputing, software maintenance and electronic record keeping.

The registration fee is $200. More information is available from Ginny McCormick, GSA, 4KIT, 75 Spring St., Atlanta, Ga. 30303; or Jim McNeil, GSA, 6KIT, 1500 E. Bannister Road, Kansas City, Mo. 64131.

Shared-tenant communications to be subject of July 26 seminar

ARLINGTON, Va. — "Shared-Tenant Telecommunications, the Driving Force Reshaping Three Multibillion-Dollar Industries," is the subject of a seminar that will be held on July 26-27 at Stouffer's Concourse Hotel here.

Sponsored by Telestrategies, Inc., the conference is directed at building owners, real estate developers, equipment vendors, telephone companies, entrepreneurs and interconnect companies. It will focus on making buildings intelligent by enhancing telecommunications and information processing.

At a one-day preconference seminar to be held on July 25, Dr. Jerome G. Lucas will address comparisons of shared digital PBX and local computer network systems. Three afternoon speakers will address issues in building design, facilities management and teleconferencing.

Sessions will include "The Shared-Tenant Telecommunications Marketplace," "The Tenant Perspective: Fortune 500 vs. Small Business Market Niches," "Inside Wires: Whose Responsibility Is It?" and "Shared Communications Networks in Energy Management."

Registration is $495 for the preconference seminar, $795 for the two-day conference and $1,095 for all three days. More information is available through Telestrategies, P.O. Box 1218, McLean, Va. 22101.

Conference set on robotics

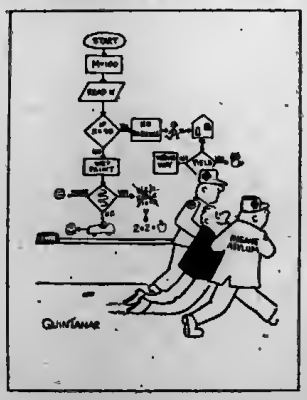
BETHLEHEM, Pa. — The first annual conference on robotics research will be held Aug. 14-16 at Lehigh University here. Sponsored by Robotics International of the Society of Manufacturing Engineers (SME), the conference will focus on the next five years of applications arising from robotics research.

Among those topics will be an examination of advances in hardware, functional processing, integrated processing, systems and supporting technology. Some 30 technical papers will also be presented, the sponsors said.

The conference will feature two tours of the university's robotics institute and technical sessions on control theory, vision systems, kinematics, dynamics and control, robot software systems, sensors and materials, among other topics.

Roughly 300 engineers, researchers and executives are expected to attend the conference. The registration fee is $295 for SME members and $365 for nonmembers. Nonmember registration includes a one-year membership in the SME or one of its organizations.

Further details about the conference are available from the SME, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.



YOUR MOVE

For multi-user on-line systems, your customers demand 32-bit price/performance, UNIX, and data integrity. Make the right move.

One move can give you a sizable advantage in your markets. And, it's available now from Tolerant Systems—the Eternity Series™ on-line transaction processing system.

Eternity's 32-bit supermini performance gives you a strategic edge over your competition, while its supermicro price lets you expand your markets and increase your margins.

And, its UNIX™-compatible operating system gives you integrated transaction management, enhanced file management, application portability, and data integrity.

Without data integrity, your on-line solutions risk bottom-line problems. With Eternity's data integrity, not even a failure in mid-transaction can corrupt or destroy your customer's data. And, the transaction restarts immediately upon system restoration—with current, accurate data.

Eternity's advanced system software also features powerful application generation tools for increasing your developers' productivity and accelerating your time to market. These tools include a screen-based forms manager, a relational DBMS with end-user access, and an application system manager.

So, if your markets demand high-performance transaction processing and UNIX with data integrity, make the right move. The Eternity Series is available now.

Learn more about Eternity by contacting Shirley Henry, Director of Marketing, Tolerant Systems, Inc., 81 East Daggett Drive, San Jose, CA 95134, (408) 946-5667, TELEX 278860.

Tolerant
systems
The Right Move.

The Eternity Series from Tolerant Systems is designed to operate in Class II office environments.
UNIX™ is a trademark of Bell Laboratories.
Eternity Series™ is a trademark of Tolerant Systems, Inc.

NEWS

Venezuelan firm implements DP service in 18 months

VALENCIA, Venezuela — Outstanding results have been claimed here by the nation's ninth largest insurance company, which developed and implemented 85% of its entire data processing requirements in just 18 months.

Seguros Carabobo, C.A., built 17 different applications from scratch, ranging from general ledger and payroll to detailed underwriting statistics. According to Rafael Alfonso, the consultant hired to spearhead the project, much of Seguros' success can be attributed to a fourth-generation software package from Hewlett-Packard Co., called Rapid 3000.

"Due to the level of development of third-world countries, systems work can be quite cumbersome in regions like Venezuela," Alfonso said. "The educational level of users and systems personnel is low when compared to a country like the United States. At Seguros Carabobo, for instance, the project was carried out by one project manager, four analysts and eight programmers — of which only the project manager and two analysts [were] college graduates.

"Also, the rate of change is quite fast in developing countries — and this eventually affects most business routines. Venezuela, for example, had over 3,000 presidential decrees from 1974 to 1978, none of which required congressional debating or approval," Alfonso said.

"To complicate matters even more," Alfonso added, "let's not forget that all software manuals, messages and prompts are in English, and the language spoken in Venezuela is Spanish."

Consequently, MIS managers in third-world countries take a very long time to develop business applications. Further, by the time they finish, changes in business procedures usually make their systems obsolete or in need of major maintenance before installation.

In 1981, top management at Seguros Carabobo decided to renovate totally its computer department, and a business plan was carried out. Based on the plan, personnel were hired and fired, systems offices were expanded and refurnished and a new computer was acquired, Alfonso explained.

Key step

Selection of the computer system was the key step in the early stages of the project. "Our evaluation criteria was quite ordinary, except for the heavy emphasis on programming productivity," Alfonso said. "We were fortunate to have a selection committee whose members all identified development productivity as a crucial factor for the success of the overall project. We had heard about fourth-generation software, which at the time was still a fledgling concept, but we knew it was exactly what we needed."

An HP 3000 Model 44 was eventually chosen over four other computers that were considered. The choice was due largely to HP's Rapid 3000 software. The purchase was made in February 1982, and the equipment was delivered two months later.

The first five months in 1982 were spent establishing analysis, design and programming standards; setting up a development methodology; and planning all future computer activities. On June 15th, the systems development process was officially started. The final due date was set for December 31, 1983. Eighteen-and-a-half months were allotted for the development and implementation of the required 17 different applications.

"When we started, our task seemed very large," Seguros' systems manager Juan Ortega said. "But in 18 months, we analyzed, designed, programmed and implemented 17 totally interactive applications, made up of 912 separate programs, which produce 265 reports and handle 880 different screen designs. We've got six data bases, having a total of 284 files and 1,891 fields."

British Airways touts UPS as Europe's most extensive

HEATHROW AIRPORT, England — The most extensive back-up power system in Europe is believed to be a $2 million configuration that protects British Airways' newly built computer center here.

Because it is so important for the airline to maintain its operation at maximum efficiency, British Airways commissioned Holec Ltd. of Surrey, UK, an Anglo-Dutch electrical company, to install five Holec/Heemaf rotary, no-break sets, configured in parallel. If one set should fail or be out of service for maintenance, a full load can still be maintained by the remaining four.

The contract also called for three standby generators, a main distribution switchboard and a fuel storage and automatic transfer system.

The parallel configuration is available in diesel and battery versions. It filters and stabilizes the main electrical supply, as well as taking over instantaneously as a short-term emergency source of energy, should the main power fail.

System security is maximized by the rotating machinery's ability to supply short circuit currents of 10 times the full load capacity to operate the necessary protection, should a fault occur in one of the load feeders.

This uninterrupted power supply (UPS) architecture has the advantage of using fewer components, compared with traditional series-connected systems. It also avoids the complication of having to introduce on-load power conversion techniques for improving the quality of the main supply during normal operation.

"The [back-up] units have effectively demonstrated their ability to withstand constant on-off switching," said Colin Fromings, British Airways' Project Team Manager for the Comet House installation at Heathrow Airport. "The design of the overall multiple-machine system allows us to get at any part for maintenance without disturbing the power supply. Also, electrical efficiency has proved very good, much higher than any other system that we've used or studied."

The UPS sets at British Airways are responsible solely for protecting the computers; standby power for the computer center services — air conditioning, lighting — will be provided by three Auto-Diesels 650 kVA generators.

The main supply from the transformers to the switchboard, UPS and standby generators is carried by a cast-resin insulated bus-bar system, which British Airways believes will offer greater safety and durability than conventional cables.

"We're feeling very secure about our system," Fromings concluded.

British Airways backup power system

Officers elected at DUG forum

KANSAS CITY, Mo.— Pat Pitkin, director of the Rochester Institute of Technology's Wallace Library, Rochester, N.Y., was elected president of the Data Phase Users Group (DUG) at the organization's fourth annual meeting here recently.

David Sheehan of Central/Western Massachusetts Automated Resource Sharing in Paxton, Mass., was elected vice-president.

DUG consists of more than 70 library groups that use Data Phase Corp.'s Automated Library Information System.

More information is available from DUG, c/o Data Phase Corp., 9000 W. 67th St., Shawnee Mission, Kan. 66202.

OECD subcommittee to attempt accord on transborder data flow

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — On the final day of a meeting held here last March by an Organization for Economic Cooperation and Development (OECD) subcommittee to deal with transborder data flow issues, France submitted its version of how a regulatory framework should be erected.

"We were startled," Ken Leeson, a U.S. State Department official representative on the committee, recalled here last week. "It goes very much against the thrust of what [the U.S.] and hopefully the other OECD members want to see, which is the freer and less regulated flow of information services and data."

Next week, the OECD subcommittee on transborder data flow will regather in Paris to try to hammer out a "statement of general agreed intent" — an OECD policy on transborder data flow that the U.S. government and industry hope will liberalize and harmonize the regulatory treatment of the data flows. However, because of France's 11th-hour submission, U.S. officials are not optimistic that substantive progress will come of the meeting, according to Leeson, who addressed an industry advisory group here last week.

The French traditionally have argued for greater controls over multinational firms' data transmission needs, citing threats to a country's economic development and cultural identity and the " pauperization" of medium-size nations by the U.S., which has the most developed information economy. The French want to set up a regulatory scheme requiring large multinational corporations to declare the content of the data they want to ship out of a country.

According to the French scheme, data would be classified into one of three categories: traded data, which is exchanged through a formal contractual-type arrangement; nontraded data, such as information or data bases that are exchanged between a transnational corporation's subsidiary and home office; and data accompanying international trade, or information carried within the parts of a product or good that has been traded between one country and another.

The French suggested that the eight members of OECD agree on "proposed assumptions" regarding the three categories and that present and potential problems be listed for each category as a way of

See OECD page 39

CIA chief says 300 firms diverting military high tech to Eastern bloc

By Bryan Wilkins
CW Washington Bureau

PALO ALTO, Calif. — The U.S. government has identified some 300 firms operating in more than 30 countries that are engaged in schemes to divert militarily critical high-technology products to Communist bloc countries, CIA Director William J. Casey said in remarks before a select group of high-tech executives.

Casey's remarks, made to an audience of Silicon Valley manufacturers on April 3 and dubbed the "Silicon Valley speech" by the CIA Public Affairs Office, were widely reported in Europe, but drew little attention in the U.S., presumably because they were delivered at the private Commonwealth Club here.

In his talk, Casey said the 300 firms are part of a "sophisticated international diversion operation" set up by Communist bloc countries to acquire computer and microelectronics know-how, especially from small, leading-edge Silicon Valley firms, where "security procedures are usually inadequate to protect against penetration by a determined, hostile intelligence service."

Communist intelligence agencies "also use sophisticated international diversion operations," Casey said. "We have identified some 300 firms operating from more than 30 countries [that are] engaged in such diversion schemes. And there are probably many more that remain unidentified."

Most of the illegal trade diversions to the Communist bloc are occuring by way of Western Europe, according to Casey.

The CIA would not identify the 300 firms cited by Casey. The Department of Commerce, which issues export licenses, and the U.S. Customs Service, whose Operation Exodus is aimed at catching illegal high-tech exports, disclaimed any knowledge that a specific list of firms has been drawn up.

A CIA information officer said the CIA has no actual list of companies suspected of schemes to divert technology to the Communist bloc countries.

Only through the combined efforts of government agencies as a whole "have we identified the 300 firms," he said.

In his California speech, Casey said that acquisition of microelectronics production technology "is the single most significant industrial technology acquired by the Soviets since the end of World War II."

Prime target

Silicon Valley firms are "the primary target of Soviet and East European intelligence services," he said.

Processing and production technologies they acquired in the 1970s, he claimed, include wafer preparation, circuit mask protection, device fabrication and assembly and test equipment.

Turning to Japanese-U.S. competition in microelectronics, Casey said that "the continuing erosion of U.S. market share" is being met by an effort by the government to "bring to task U.S. companies who have failed to meet Defense Department specifications on contracts."

Casey added, "Increasingly in Europe and the U.S., domestic companies are serving as a Trojan horse for Japanese semiconductor and computer suppliers. . . . The Japanese companies such as NEC [Corp.], Fujitsu [Ltd.] and Hitachi [Ltd.] have made arrangements to supply top-of-the-line computers and permit domestic firms to affix their own labels.

"We view this as a dangerous course in a national security context as well as in a commercial context," Casey said.

NEWS

INTERNATIONAL REPORT
CW International News Network

AUSTRALIA

WANGARATTA — The first shipments of Australian-made versions of the IBM Personal Computer and Personal Computer XT went out last week, a month ahead of schedule. The machines are rumored to have gone to Hisoft Pty. Ltd., IBM's Dealer of the Year, which is expected to sell them to Australia's Hawthorn Institute.

■

MELBOURNE — Alpha testing reportedly started this week on a software product billed to be the first business applications generator for Unix operating environments. The software was developed by the Melbourne software house BBJ Computer Services Pty. Ltd. on a Wicat Systems, Inc. computer and is being sold through Wicat. It will soon be converted to run on Hewlett-Packard Co.'s HP 9000 system, sources reported.

CHINA

BEIJING — Computerland Corp. of America has announced the completion of the first step in becoming the primary outlet here for microcomputer products produced in the rest of the world. A letter of intent to create a joint venture was signed recently by Computerland founder and chairman William Millard and officials of the Chinese Ministry for the Electronics Industry. The joint venture company would be called Computerland China and would open retail centers throughout the People's Republic. Negotiations are expected to be completed by the end of the year, according to sources.

HONG KONG

HONG KONG — Apple Computer, Inc. has issued a writ against local computer and electronic games maker Video Technology Ltd., claiming copyright infringement on two of its computer programs. According to the writ, Video Technology has infringed copyright on Apple's Autostart and Applesoft programs. Meanwhile, Video Technology is involved in an ongoing, unrelated dispute with Atari Corp. over Atari's popular Pac-Man video game.

JAPAN

TOKYO — Fujitsu Ltd. has enhanced its Facom V small systems series and unveiled a line of workstations and printers. The company boosted the memory of the V 830 from 2.75M bytes to 3.5M bytes; the V 850's capacity has been expanded from 3.5M bytes to 5.5M bytes; and the V 870 has been increased from 4M bytes to 7M bytes. The new workstation, called Facom 8010, is said to accept and send data to and from the V series' data base. The 768K-byte workstation is based on Intel Corp.'s 8086 microprocessor. A high-speed Kanji-character nonimpact printer, the Facom 6900 A, was also released, according to the firm.

■

TOKYO — The Institute for New Generation Computer Technology, which is developing the fifth-generation computer, has unveiled a relational data base machine, calling it the "first step" in the development of knowledge-based computers. The machine will reportedly provide a test environment for the study of knowledge-based functions. It is comprised of an arithmetic processing unit and a hierarchically structured memory unit.

■

TOKYO — Plans are in the works for Storage Technology Co., Ltd. (STC) to produce magnetic storage devices and hard disk drives here in Japan within the coming year, according to Yoshinobu Noguchi, the president of STC Japan. STC intends to expand its business by building production facilities and establishing joint ventures, collaborative R&D projects and OEM pacts.

TAIWAN

TAIPEI — IBM has contracted Taiwan's Institute for Information Industry to develop a series of Thai language software packages for use with the IBM 5550, a 16-bit system for which the institute developed a series of Chinese-language packages last year. The project will be completed in July, when IBM will begin marketing the machine in Thailand. The Thai-language packages are rumored to include word processing, accounting and other basic financial applications.

WEST GERMANY

BERLIN — "Individual Data Processing" was the theme of this year's IBM Users Congress, held here recently. According to IBM's conference organizer Paul Elsaesser, individual data processing should not imply do-it-yourself processing, nor should it mean collective or centralized information processing. Rather, Elsaesser maintained that development and maintenance of applications systems, such as information gathering and processing with data from already existing data base systems are all areas where individual data processing can be used best.

OECD from page 38

avoiding the politically difficult decisions required to set up an international framework of regulations that would govern data flows.

In regard to "traded data," the French said they see a problem with maintaining the freedom of establishment or presence in a market by a firm; for intracorporate data, they see a problem with "the location of jobs"; and with data accompanying international trade, they see problems "of free circulation of data and equitable conditions of access."

The U.S. government's position toward the French initiative is that the three data categories are "arbitrary data structures," Lesson said.

"We are not interested in writing regulations for intracorporate data flows. As a result of this [French] move, we don't hold out much hope for progress at the July meeting, although it could happen," he said.

He said there does not appear to be a coordinated scheme behind the French move, and trying to determine one has been impossible.

NEWS

Stanford may contract firm for Decsystem replacement

By David Gross
CW Staff

PALO ALTO, Calif. — Stanford University is considering a proposal from a small Silicon Valley manufacturer to build a replacement for Digital Equipment Corp.'s Decsystem-20 mainframes.

That announcement by Stanford, a large Decsystem-20 user, comes one year after DEC announced it had scrubbed its Jupiter project to develop a high-end successor for its Decsystem-10 and 20 mainframes. The DEC decision disappointed many of DEC's more than 1,000 Decsystem customers worldwide, including Stanford, which had been counting on the project for an upgrade path.

"When Digital managed that project into the ground or failed to wish it to succeed — I don't know which it was — they really did us a great disservice," said Len Bosack, director of computer facilities for the computer sciences department at Stanford, whose campus houses 10 Decsystem-20s. "In terms of the size of the enterprise and the real financial and intellectual impact on the university, we depend on [the Decsystem-20s] very, very heavily."

Unacceptable alternative

At the time DEC announced it had killed the Jupiter project, the vendor proposed an alternative for Decsystem users whereby they could tie the 36-bit computer system into the 32-bit VAX-11 superminicomputer line through the firm's "interconnect cluster concept" and Xerox Corp.'s Ethernet local-area network [CW, May 30, 1983]. But Stanford found DEC's VAX alternative unacceptable.

"We have had 36-bit architecture machines at Stanford for almost 20 years now," Bosack said. "Over the course of that time, we have constructed — both ourselves and based on software. Digital provides — an environment that is very well-suited to the work that we do here."

DEC claimed that its VAX alternative does not require a conversion, but Sandra Lerner, director of computing facilities at the Graduate School of Business, said a costly conversion would be involved that would require changing all programs accumulated during nearly a 20-year period at Stanford.

Several thousand students, faculty and staff would have had to be retrained, she added.

The university has some programs that have been under development for a decade; this is especially true of the large artificial intelligence systems based on the Lisp language. "I can't begin to describe to you how hard it is to move something like that to another computer," Bosack said.

Bosack said the university looked to the future and determined it did not want to convert to a different environment twice. "We see certain developments on the horizon, both in research institutions and commercially, that in the 5- to 10-year timeframe will provide an environment which we think will be genuinely better, which will be worthwhile converting to," Bosack said.

Stanford is, therefore, considering a contract with Foonly, Inc., a Mountain View, Calif., manufacturer of DEC-compatible systems, that would involve two machines costing a total of about $1.5 million. Foonly is owned by former Stanford student, David Poole.

According to Ralph Gorin, director of Stanford's academic computer center called Lots, the Foonly F1B system is an outgrowth of design work done by Poole and others while at the Stanford Artificial Intelligence Laboratory. The F1B is completely compatible with the Decsystem-20, he said.

Bosack said the F1B boasts a computing power roughly four times faster than the Decsystem-2060 and 10 times faster when doing floating-point computations.

Although Foonly is the only company to submit a formal proposal to the university, Bosack said two other companies, Tymshare, Inc. of Bethesda, Md., and Systems Concepts, Inc. of San Francisco, also have expressed interest in the idea.

Decsystem-20s are the most numerous large systems on the Stanford campus. The systems are used by the Graduate School of Business, the Department of Electrical Engineering, the artificial intelligence project at the Sumex medical center and the Center for the Study of Language and Information.

The Stanford University Network (Sunet), a universitywide computer communications network, ties together the 10 Decsystem-20s, about 20 medium-size computers, about 100 workstations and nearly 400 terminals and microcomputers.

Rose Ann Giordano, DEC's vice-president of large systems marketing, said the company does not consider the Stanford move as a rejection of DEC products. She noted that the university is continuing to purchase Decsystem-20s and is involved in a research and development program with DEC to establish a campuswide distributed computing network.

"Obviously [Stanford] did want the Jupiter," Giordano said. "But we have come out many times and given our reasons for why we thought it was in the best interest of our customers and Digital to cancel that."

Relational DBMS keeps tight rein on consultant's plans

MONTREAL — With projects as diverse as offshore oil exploration, development of a telecommunications network and electrification of a 50,000-sq km region in Saudi Arabia, the SNC Group believes in strict project controls.

SNC, which is Canada's largest engineering consulting firm, provides project management, engineering, procurement, construction and commissioning services to clients around the world. Its 5,000 employees operate out of engineering offices in Montreal, Toronto, Calgary and Edmonton and project sites throughout Canada, Africa, India, Saudi Arabia and South Africa. On occasion, hundreds of people may be involved in a single project.

SNC is involved in all aspects of an engineering project, from initial concept through construction. To control each stage, SNC developed a computerised project management and control system on Digital Equipment Corp.'s VAX-11/780 superminicomputer using Oracle, a relational data base management system (DBMS) from Oracle Corp.

Normand Bouffard, manager of SNC's project systems services, explained that the system is a network of interconnected modules. Each module performs a specific data processing function that may require the interchange of data processed by other modules. As many as 25 people might need to access data concurrently, he said.

According to Bouffard, Oracle is the core of every SNC-developed module. The on-line modules share and build upon common data and have processing and inquiry capabilities. In addition to SNC-developed modules, the firm has also purchased off-the-shelf application software packages that fit into the project control system environment.

Because the Oracle DBMS is based on IBM's English-like Standard Query Language (SQL), the user need not know a sophisticated computer programming language in order to access information, Bouffard said.

Oracle presents data in two-dimensional tables. At SNC, the data base currently consists of about 60 tables. All the tables can be subsetted and/or combined using the SQL query language and the result maintained as a "view," or virtual table.

SNC's goal was to develop control systems for use on engineering, procurement and construction projects. The systems needed to be interactive so that the construction team, for example, could access the data entered by procurement or inspection teams, Bouffard said.

The first priority was a material control system to track equipment from the initial requisition through the time it is issued to a foreman at the construction site. The system provides status, cost and delivery date, as well as vendor information, bills of material and construction inventories.

Materials management system

The major system developed using Oracle so far is a materials management system oriented toward piping jobs, Bouffard said. The Piping Bulk Material Control System is used to track materials from procurement through installation.

Before SNC began using Oracle, Bouffard explained, all processing was done in batch. With Oracle, however, systems in each of the areas operate with data from the other systems.

For example, SNC developed an interface between Davy Computing, Ltd.'s Compaid application package, which stores isometric piping bills of material, and the firm's petro-chemical jobs.

In this way, the Piping Bulk System always has the most current parts/commodity catalog and isometric bills of material, Bouffard said.

Any revisions made to Compaid automatically trigger an update of the Piping Bulk Material Control System. Project procurement personnel build upon existing information rather than reentering information.

SNC considered three DBMS before deciding on Oracle. Bouffard said the decision was based on four factors: its reputation as a proven relational DBMS, ease of use of SQL, data integrity features and prototyping tools.

Used with standard languages

The Oracle query language is SQL-Plus, a superset of SQL. In addition to standard nonprocedural features, SQL-Plus can be used from programs written in all standard programming languages, allowing SNC to use its existing Cobol programs.

Oracle's Interactive Application Facility can be used to define, query and update screen-oriented applications, and the Interactive Report Writer can format automatically the output of an SQL-Plus query into reports and other documents, Bouffard explained.

Since installing Oracle, Bouffard said his group has been able to support the project team at remote sites, as well as the management team at company headquarters. With terminals installed at remote project sites to support such functions as inventory control and labor productivity, the people using the systems are the ones who are actually performing the work.

Maintenance eases Avis head crashes

GARDEN CITY, N.Y. — When Avis Car Leasing, Inc. began experiencing an inordinate number of head crashes, its information systems director discovered that supposedly maintenance-free removable disk packs ran best with semiannual preventive maintenance checks.

"We really need reliability with our interactive system because so many people depend on us to carry out the company's car leasing business. The most important thing is the integrity of the data," said Joel D. Rubin, director of information systems for the subsidiary of Avis, Inc. based here.

Explained Rubin, "We support the whole life cycle of car leasing, from initial customer leasing information all the way through used-car sale of the vehicles, and we produce accounting reports for the billing and accounts receivable functions. Crashes and delays are a big problem for those farther on in the system who depend on our reports to do their work, as well as giving everyone a bad impression of the data processing support."

The crash problem appeared in late 1982. The company uses three Computer Automation, Inc. Syfa minicomputers and 75 removable disk packs for four Control Data Corp. Model 9762 disk drives and six CDC Model 9766 disk drives. The drives provide more than 2G bytes of on-line storage. One processor and 32 terminals are used for interactive tasks from 8 a.m. to 8 p.m. A second processor is used for backup and batch processing, including daily batch processing from 8 p.m. to midnight, while the third is used for development.

Rubin said engineers advised against using mechanical cleaning devices and recommended the manual cleaning system of Precision Methods, Inc., a Lorton, Va., firm that provides disk maintenance, repair and refurbishing.

For approximately $1,400 annually, PMI technicians visit Avis every six months, check for contamination, such as burned oxide deposits on the disks, and manually clean disks, covers, shields and hubs, Rubin said. The technicians also provide written reports on their inspections, allowing Avis to correct whatever is causing the contamination.

The maintenance is performed on Sundays, when Avis shuts down its system for other types of maintenance.

"Removable disk packs were thought to be maintenance-free when they were first introduced, but even the manufacturers now recognize that contamination can occur," Rubin noted. "I look at PMI's preventive maintenance as an insurance policy. Their service gives me an opportunity to detect problems before they occur. It also has made us more aware of the proper method of handling disk packs."

In addition to providing better service, eliminating head crashes means less work for those in the computer room. "Crashes are a problem here, too. It means we have to go back to the previous day's backup, restore those files and then reenter all of the transactions and information that had been keyed in up until the time of the crash. That's a rather onerous task for the staff," he said.

Joel Rubin, director of information systems for Avis Car Leasing's DP center in Garden City, N.Y.

IEEE names president-elect

BOSTON — Charles A. Eldon, manager of capital equipment of Hewlett-Packard Co. of Palo Alto, Calif., was named president-elect of the Institute of Electrical and Electronics Engineers (IEEE) at a recent special meeting of the IEEE assembly here.

Eldon will replace Dr. Donald D. King, who died March 13. Eldon will become the 1985 IEEE president on Jan. 1, 1985. The 1984 IEEE president is Dr. Richard J. Gowen, vice-president and dean of engineering, South Dakota School of Mines and Technology in Rapid City, S.D.

Eldon is responsible for capital equipment acquisition for manufacturing processes for HP worldwide, including processing engineering studies, corporate purchase agreements and vendor relations. Long active in the IEEE, Eldon served as treasurer in 1981-82.

The IEEE has 250,000 members in over 120 countries and is one of the world's largest technical professional organizations.

Local net helps Big Eight firm save on documents

NEW YORK — A Big Eight accounting firm, using a local-area network with computer workstations and laser printers, said it has saved $300,000 on one document creation project and is reducing the time required to prepare other documents and publications by 50% to 75%.

Peat Marwick International recently decided to take advantage of advances in microcomputer technology for performing analysis of work paper used by auditors in field offices. The application of work paper analysis to eight specialised industries would require the generation of 180 different matrices.

A cost analysis of preparing these forms using traditional methods showed that approximately $2,000 would be needed for each document — a total of $360,000 for the project. A less costly solution had to be found.

After investigating noncomputerized methods of creating the work papers, the company's production services department decided on a Xerox Corp. integrated office system and an Ethernet local-area network. According to Peat Marwick, the deciding factor was that the Xerox systems reduced the estimated cost of $2,000 per individual spreadsheet data collection document to $140, a reduction of 93%.

Moreover, document generation costs continue to decrease as operators become more familiar with the features of the systems, the company said.

Peat Marwick's all-Xerox local-area network is comprised of three 8010 Star Information Systems, an 860 information processing system, a rigid disk file server for mass storage of information and a laser printer that prints at rates up to 3,000 word/min. A coaxial cable joins the devices together and provides for high-speed communications among them.

The network is cutting costs in other applications as well, according to Barbara Kayton, director of administrative services. Graphics artists and other department users can operate the system after two weeks of self-training and can be highly effective after three months.

"Since the network was installed in October 1982," Kayton said, "it's proven itself more than cost-justified for other applications besides the work papers. Prior to the network, technical manuals running from 150 to 900 pages would be submitted to us by our technical specialists. We would edit the copy for style, format and content and send the material back for the approval process. Sometimes a single manual would receive 20 sets of changes.

"Then we would send the manuscript outside to a typesetting vendor. We would get galleys, page proofs and then reproducible copy that was sent to an outside printer," she said.

Course materials for Peat Marwick's executive education program also are processed on Ethernet. "We produce materials for 57 standard courses each year," Kayton said. "Some standard courses are adapted to fit specific client needs. Instead of starting from scratch, we use the Ethernet system to pull elements of the course together and make the adaptation necessary to a particular client. Here again, we save 50% to 75% of the time it used to take up to adapt a course."

In a similar manner, the network system is used to create manuals for use in the U.S. and abroad. With the 8010's capabilities of reproducing entire blocks of stored copy and inserting special copy where needed, special editions of each manual are quickly produced for international offices.

As a result of cost and time savings like these, utilization of the network system has steadily increased, and to meet the added demand, Peat Marwick is upgrading its 80M-byte file server to one that will provide 300M bytes of mass storage.

Softcon merges two conferences

CHESTNUT HILL, Mass. — Northeast Expositions has merged the two Softcon conferences planned for spring and fall 1985 into a single event that will be held March 31-April 3, 1985.

The move was made, according to spokesman Bill Mahan, because computer shows have reached a saturation point and exhibitors would rather have one firmly entrenched annual show than multiple exhibitions.

Softcon 1985 will differ from Softcon 1984 by having a stronger emphasis on international markets. In addition to targeting merchandisers, distributors and volume business users in North America, Softcon marketing will target key attendance groups in Europe, Japan, the UK and other selected overseas markets.

Registration for Softcon is $35 for an exhibits-only admission or $195 for the four-day conferences and exhibits badge. More information is available through Softcon, c/o Northeast Expositions, 822 Boylston St., Chestnut Hill, Mass. 02167.

CALENDAR

WEEK OF SEPT. 2

SEPTEMBER 4-7, NEW YORK — **TSO ISPF.** Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10016.

SEPTEMBER 4-7, NEW YORK — **CICS Application Design.** Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10016. Also being held Sept. 10-13 in New York.

SEPTEMBER 5-7, WASHINGTON, D.C. — **Configuration Management of Software Programs.** Contact: George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

SEPTEMBER 5-7, SAN JOSE, CALIF. — **Office Automation and the Technology Revolution.** Contact: Data-Tech Institute, 386 Franklin Ave., Nutley, N.J. 07110. Also being held Sept. 12-14 in Columbus, Ohio.

SEPTEMBER 5-7, CHICAGO — **Structured Analysis for Users.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 5-7, ALBUQUERQUE, N.M. — **New Gateways to SNA.** Contact: Data-Tech Institute, 386 Franklin Ave., Nutley, N.J. 07110.

SEPTEMBER 5-7, NEW YORK — **Managing Projects in the Structured Environment.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 5-7, TORONTO — **Capacity Management Forum.** Contact: Institute for Information Management, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

SEPTEMBER 5-7, WASHINGTON, D.C. — **Artificial Intelligence.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 6-7, SAN FRANCISCO — **Systematic Software Testing.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 8-9, NEW YORK — **CICS Internal Architecture.** Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10016.

WEEK OF SEPT. 9

SEPTEMBER 10-11, BOSTON — **Fourth-Generation Data Management Software.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

SEPTEMBER 10-11, WASHINGTON, D.C. — **DBS IV.** Contact: Seminar Registration, Phillips Publishing, Inc., Suite 1200N, 7315 Wisconsin Ave., Bethesda, Md. 20814.

SEPTEMBER 10-11, HASBROUCK HEIGHTS, N.J. — **Supporting and Maintaining the Data Communications Network.** Contact: Data-Tech Institute, 386 Franklin Ave., Nutley, N.J. 07110.

SEPTEMBER 10-12, TORONTO — **The Second International Congress on Computer Security (IFIP/Sec '84).** Contact: IFIP/Sec '84, International Security Congress, 160 Duncan Mill Road, Don Mills, Ont., Canada, M3B 1Z5.

SEPTEMBER 10-12, NEW YORK — **IMS Utilities.** Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10016.

SEPTEMBER 10-14, MINNEAPOLIS — **Structured Programming Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 10-14, NEW YORK — **MVS JCL.** Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10016.

SEPTEMBER 10-14, PARIS — **The Sixth International Congress of Cybernetics and Systems of the World Organization of General Systems and Cybernetics.** Contact: Association Francaise pour la Cybernetique Economique et Technique, 156 Blvd. Pereire - F. 75017, Paris, France.

SEPTEMBER 10-14, BOSTON — **Structured Analysis and System Specification Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Sept. 10-14 in Houston.

SEPTEMBER 10-14, WASHINGTON, D.C. — **Operating Systems for Microcomputers.** Contact: George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

SEPTEMBER 10-14, ANAHEIM, CALIF. — **Structured Design for Real-Time**

NEWS

Systems. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 10-14, NEW YORK — Data Base Development Workshop. Contact: Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

SEPTEMBER 10-14, PHOENIX — Project Planning and Control Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 10-14, HOUSTON — MVS/SP & XA. Contact: Computer Systems Research, Inc., 40 Darling Drive, Avon, Conn. 06001.

SEPTEMBER 10-14, CLEVELAND — Structured Analysis and Design Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Sept. 10-14 in Denver.

SEPTEMBER 10-14, ATLANTA — Structured Design Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 11-12, CHICAGO — Information Centers. Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

SEPTEMBER 11-12, DALLAS — Integrating the Mainframe and the Micro in the Corporate Environment. Contact: Institute for Advanced Computing Technology, Suite 108, 1433 Santa Monica Blvd., Santa Monica, Calif. 90404.

SEPTEMBER 11-13, DALLAS — Midcon/84 High-Technology Electronics Exhibition and Convention. Contact: Electronic Conventions, Inc., 8110 Airport Blvd., Los Angeles, Calif. 90045.

SEPTEMBER 11-13, DALLAS — Data Base Administration and Data Resource Development. Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

SEPTEMBER 11-13, DALLAS — Mini/Micro Midwest-84 Computer Conference and Exhibition. Contact: Electronic Conventions, Inc., 8110 Airport Blvd., Los Angeles, Calif. 90045.

SEPTEMBER 11-13, BOSTON — Electronic Imaging 1984. Contact: Electronic Imaging 1984, Morgan-Grampian Expositions Group, 2 Park Ave., New York, N.Y. 10016.

SEPTEMBER 11-13, ARLINGTON, VA. — Voice Input/Output Systems Applications Conference 1984. Contact: Association of Voice Input/Output Systems, P.O. Box 60904, Palo Alto, Calif. 94306.

SEPTEMBER 11-14, LOS ANGELES — Unix Systems Expo/84. Contact: Computer Faire, Inc., 181 Wells Ave., Newton, Mass. 02159.

SEPTEMBER 11-14, WASHINGTON, D.C. — Distributed Processing: Mini and Microcomputer Implementations. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Sept. 25-28 in Boston.

SEPTEMBER 11-14, WASHINGTON, D.C. — Data Communications. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Sept. 25-28 in San Diego.

SEPTEMBER 11-14, LOS ANGELES — Designing Real-Time Systems: A Hands-On Workshop. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Sept. 25-28 in Washington, D.C.

SEPTEMBER 11-14, WASHINGTON, D.C. — Designing with 16-Bit Micros. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Sept. 18-21 in Los Angeles and Sept. 25-28 in Long Island, N.Y.

Conference explores integration of robots, computers

By Edward Warner
CW Staff

DETROIT — An increasingly close relationship between the computer and the robot means that robots can now be programmed off-line — without shutting down an assembly line — and that manufacturers can model robots on a computer-aided design and manufacturing (CAD/CAM) system, even before the robots are purchased.

Those advances were noted in presentations and product announcements at Robots 8, the international conference on robotics held here earlier this month. To allow manufacturers to preview how a robot will function at its work site, several manufacturers displayed robot modeling packages running on CAD/CAM systems, and one engineer discussed, in a seminar, a software program that he authored to provide a similar function, but on a microcomputer.

In the off-line programming arena, GMF Robotics, the joint venture of General Motors Corp. and the Japanese robot maker Fanuc, introduced a robot programming workstation, and IBM discussed its extensive efforts in that field.

Off-line programming

All IBM robots can be programmed off-line by IBM Personal Computers or IBM Series/1 minicomputers, according to Mike Condon, a strategic planning manager for IBM's Manufacturing Systems Products independent business unit. Without off-line programming, Condon explained, robots must be programmed via their controllers, which requires the unit to be taken out of service.

"You have to have off-line programming or you tie up your facility," Condon said in an interview.

Condon couldn't say how many robots IBM has in use at all of its manufacturing facilities — there are 250 alone at one plant in Lexington, Ky., he noted — but he did point out that the firm's plants in Tucson, Ariz., and Raleigh, N.C., use robots extensively. The Tucson facility integrates the computer with the robot so completely that a central data base, running on a 4300 series IBM mainframe there, downloads to each robot, in a work cell making printed-circuit boards, the name of each part needed and how it should be installed.

Such extensive computer integration, Condon said, means that the circuit board assembly area is flexible enough to switch quickly from making one version of the product to another, all on the basis of commands from the mainframe.

GMF's new Smartware workstation for off-line robot programming, introduced at Robots 8, focuses on the logic side of robot programming, where GMF spokesman Steve Penn said 90% of a robot's programming occurs. Logic programming, he explained, covers the robot's interaction with the assembly line and other machines, while geometry programming, which covers the robot's scope of movements, is still best done at the robot controller.

Using the Smartware workstation, he said, new robot programs can be written for robots that are still at work or for robots that have yet to be installed. When it comes time to change programs, the workstation can transfer the program to the robot via an RS-232 connection or on a bubble cassette. In addition, standard portions of programs can be shared among several robots, and the robot's self-diagnostics can be read at the workstation, again via the RS-232 connection, to allow analysis of a robot failure.

By moving the robot programming function to a workstation, Penn said, programmers are less likely to make errors than if they were "standing out on the production line with the machine running" while they tried to program it.

In the robot-modeling sector, IBM displayed its AML/Entry Application Simulator software for its Personal Computer XT, which models the movements of a Scara-type robot within a work area. The software presents a color, two-dimensional picture of the robot's mechanical arm at work. Similar software for IBM's Catia model CAD/CAM system can model a robot's movements three-dimensionally, Condon said.

McDonnell Douglas Automation Co. (McAuto), meanwhile, displayed its Place robot modeling software for use on its Unigraphics CAD/CAM system and, with an interface, on other firms' CAD/CAM hardware. The software, which displays a color animation of the robot arm in action, allows users to "model it here and play 'what-if,'" said Wes Kliner, a McAuto marketing representative. A modeling package is based on a robot's movement specifications, provided by the robot manufacturer and can help users avoid buying a robot that won't fit their particular application, Kliner said.

On a smaller scale, Tom Winslow, a Hewlett-Packard Co. engineer, discussed in a seminar his program for modeling — on a HP 86B, HP 85 or HP 87 microcomputer — the movements of a robot arm. Winslow developed the software after his firm purchased a robot that was ill-suited to its application. The mistake could have been avoided, he said, if some means had been available to preview the mechanical arm's movement.

Portable word processor eases Pepsico's work load

PURCHASE, N.Y. — When the word processing department at Pepsico, Inc.'s corporate office here became overtaxed, the company turned to a portable word processor to help ease the work load.

At Pepsico's corporate office, the Office Information Service (OIS) center expedites paperwork generated by five Pepsico business segments: beverages, food products, food services, transportation and sporting goods. Two years ago, the word processing department began experiencing trouble meeting these departments' needs, so it began to look at a portable product to improve productivity.

But "there were few portable products on the market then," said Mary Ann Herrmann, OIS center supervisor. One product that met OIS' needs was Sony Corp.'s Typecorder, a battery-operated, 3-lb word processor. The unit, which fits in a briefcase, features a full-size keyboard, a one-line 40-character display and the ability to store up to 100 pages of text on a microcassette tape.

Because employees would be using the machine while they were out of the office, Pepsico included an acoustic coupler and a 6-lb compact printer when it purchased its two Typecorders for $2,000 each.

Typecorder has supplied a quick and simple means of providing employees with more flexible work schedules, according to Herrmann. "Employees are encouraged to use the Typecorder while traveling or for projects that require working at home," Herrmann said.

For example, corporate affairs writer Tony Sheldon-Moir gathered information for Pepsico's annual report by visiting 15 cities where Pepsico divisions and subsidiaries are based. "Instead of taking a typewriter, Sheldon-Moir brought the Typecorder and was able to file his reports from each city to Pepsico headquarters by using the acoustic coupler," Herrmann said.

For Pepsico's mass mailings, the Typecorder is also a boon. Eileen Foley, a secretary in the corporate affairs department, recently used it at home to meet the deadline for a mass mailing. She entered the addresses on the Typecorder's microcassette and then transferred them the next morning to compatible Wang Laboratories, Inc. Wangwriter word processing equipment.

Office services manager Angelo Cappello and Herrmann first spotted the Typecorder at a dealer show. By writing a term paper on it for an evening study course, Herrmann taught herself to use the product.

Typecorder is available to other departments; Herrmann trains those employees who wish to use the machine.

"Most users take the machine out for a few months," she said. "I would estimate that they use it a few hours each day. To date, we've found the Typecorder most useful for such projects as written reports and mass mailings."

Five added to OMA board; meet scheduled

AUSTIN, Texas — Five new members have been recently added to the board of directors of the Operations Management Association (OMA), including executives from IBM, the 3M Corp. and Management Science America, Inc.

The new members of the board are Bill Jones, director of production and business systems for IBM in Atlanta; Ray L. Dicasali, vice-president of Management Science America's, Manufacturing Systems Division in Winston-Salem, N.C.; and Cal Pipal, division vice-president of 3M in St. Paul, Minn.

Representatives from two universities were also elected to serve three-year terms on the board. They are Brooke Saladin, an assistant professor in the Babcock School of Management, Wake Forest College, Winston-Salem; and Robert Britney, a professor in the School of Business, University of Western Ontario, Canada.

Headquartered here, the OMA, created in 1981, is a cross-industry organization made up of executive-level management personnel and designed to address and strengthen the management of business and industrial organizations, according to Roger Schroeder, director of the Operations Management Center at the University of Minnesota and current OMA president.

The theme of the OMA's annual conference, to be held on Nov. 8 in Toronto, will be "Restructuring Operations to Meet the Competitive Challenge."

The registration fee for the conference is $95 for OMA members and $125 for nonmembers, according to a conference spokesman.

More information about the upcoming conference in November is available from James Fitzsimmons, Treasurer, OMA, Department of Management, University of Texas, Austin, Texas 78712.

EDITORIAL

You can't always count on vanity

A few years ago, an unassuming computer consultant named Stanley Mark Rifkin devised an amazingly simple plan to steal money.

By eavesdropping on the electronic funds transfer wire room at the Security Pacific Bank in Los Angeles, Rifkin obtained a code that enabled him to manipulate the bank's computerized EFT system. He transferred $10 million from Security Pacific to a foreign bank account, then converted the cash to diamonds.

It was only Rifkin's vanity that snared him. He could not resist the temptation to brag about his exploits.

Now an empirical survey from the American Bar Association [CW, June 18] has clearly shown that computer crime is a pervasive specter — more pervasive than DP managers and their bosses would like to admit. Furthermore, the problem is getting much worse. It seems that the gulf between computer technology and computer security technology is widening.

And, the survey found, we apparently are raising a generation of young computer users who don't think much about violating privacy or property via a computer. Maybe that's what happens when one's first exposure to a computer comes at the end of a joystick that can blithely destroy legions of soldiers, sailors and aliens.

So something has to be done, the experts say. But what?

If there's one thing analysts agree on, it is that any computer system can be compromised. The more formidable the security, the greater the value, obstensibly, of the secrets locked within — and the greater the challenge to those who seek to steal, alter or destroy.

Thus, some broad plan of attack must be launched on two fronts — one by the government and one by the private sector. Interestingly enough, the strongest measures to combat computer crime have come not from corporate boardrooms, but from state legislatures around the country. More than 30 states now either carry anti-computer-crime statutes on the books or are mulling over legislation to do so. Legislators are talking about tougher penalties for computer crooks, tacit recognition that computer-aided crimes or actions that destroy vital electronic data are every bit as serious as less sophisticated crimes.

Tougher statutes notwithstanding, the ABA study found that an effective federal and state ability to prosecute is lacking. Could this be due to a failure on the part of business to cooperate fully with prosecutors?

That seems a possibility, given another finding in the ABA study that most computer crime perpetrators work within the company whose system is hit, and for the most part, these individuals are disciplined internally — and quietly. Federal and state authorities never know what happened and thus are powerless to impose the more harsh detriments to computer crime.

If business is really serious about stemming the rise in computer crime, it will have to get much more serious about dealing with the known cases. It does no good to clamor within the legislatures for tougher laws when private business then turns the other cheek when one of its own gets caught.

After all, you simply cannot always depend on a crook's vanity.

LETTER

Documentation problems

I agree with the points made in the In Depth article "The tyranny of words" [CW, April 16]. However, the article overlooked a number of problems.

First, any machine that is reviewed, including its documentation, is always reviewed before the documentation is ready (there is always an apology about the temporary nature of the manuals). If people really do read and take notice of reviews, then those of us who are going to the trouble of producing high-quality documentation are hardly being given the edge we deserve.

Second, who is to produce such documentation? The small software houses often cannot afford the considerable expense of such documentation, and if the company is big enough, then it is cheaper to turn down bulk purchase orders demanding good documentation — there are plenty of people who will buy the software without it.

Third, given a choice, do you go for the best software or the best documentation? Naturally, good documents can increase the usefulness of the software, but the choice is not always easy.

Last, the costs. Manuals have to be varied to suit the various users who may speak another language, have a flexible disk machine instead of hard disk and so on. For example, there is enough difference between the British and American language, and between the cultures, (and that's not including technical and software differences) to warrant a separate version.

Richard Thomson
Apeldoorn, Netherlands

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purposes of clarity and brevity.

Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

COMPUTERWORLD

Editor
John C. Whitmarsh

Executive Editor
Rita Shoor

Managing Editor
Bill Laberis

Assistant Managing Editor
Cheryl M. Gelb

Senior Editors:
Software
Paul Gillin
Communications
John Dix
Phil Hirsch
Systems
Tom Henkel
Microcomputers
Eric Bender
Industry
Peter Bartolik
Features
George Harrar
Design Editor
Marjorie Magowan
International Editor
Susan Blakeney
Associate Features Editor
Barbara Van Scoyoc
Assistant Features Editor
Elizabeth Morse
Special Reports Editor
Donovan White

Senior Writer
John Gallant
Staff Writers:
James Connolly
John Desmond
Paul Korzeniowski
David Olmos
Donna Raimondi
Edward Warner
Correspondents:
New York
David Myers
Suite 7G
401 East 80th St
New York, N.Y. 10021
212/570-2135
Washington, D.C.
Senior Correspondent:
Bryan Wilkins
Correspondent: Mitch Betts
445 National Press Building
529 14th St., N.W.
Washington, D.C. 20045
202/347-6718

West Coast
Bureau Chief: Jeffry Beeler
Correspondent: Robert Batt
1060 Marsh Rd.
Menlo Park, Calif. 94025
415/328-8064
Chief Copy Editor
Kathie Gow
Assistant Chief Copy Editor
Charlotte Ziems
Copy Editors:
Becky Batcha
Dave Bouffard
Bruce Crane
Deborah Fickling
Penny Janzen
Lory Zottola
Assistant to the Editor
June Fettig
Editorial Assistants:
Lorraine Brien
Mary DeCristoforo

Contributors
Education
J. Daniel Couger
Human Connection
Jack Stone
Turnaround Time
Larry Long
Microcomputers
Thomas Madron
The Data Center
John P. Murray
Lecht on Solutions
Charles P. Lecht

Special Publications
Computerworld Extra!
George Harrar, Editor
Computerworld on Communications
Bruce Hoard, Editor
Computerworld OA
Ann Dooley, Editor
Computerworld Buyer's Guides
Marcia Blumenthal, Editor

Main Editorial Offices: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 55 computer publications in 24 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's *Computerworld/Argentina*; Asia's *The Asian Computerworld*; Australia's *Computerworld Australia*, *Australian Micro Computerworld*, *Australian PC World* and *Directories*; Brazil's *DataNews* and *MicroMundo*; China's *China Computerworld*; Denmark's *Computerworld Danmark* and *MicroVerden*; Finland's *Mikro*; France's *Le Monde Informatique*, *Golden (Apple)* and *OPC (IBM)*; Germany's *Computerwoche*, *Microcomputerwelt*, *PC Welt*, *Software Markt*, *CW Edition/Seminar*, *Computer Business* and *Commodore Magazine*; Italy's *Computerworld Italia*; Japan's *Computerworld Japan* and *Perso ComWorld*; Mexico's *Computerworld Mexico* and *CompuMundo*; Netherland's *Computerworld Benelux* and *Micro/Info*; Norway's *Computerworld Norge* and *MikroData*; Saudi Arabia's *Saudi Computerworld*; Spain's *Computerworld Espana* and *Micro Sistemas*; Sweden's *ComputerSweden*, *Mikro Datorn*, *Min Hemdator* and *Svenska PC World*; the UK's *Computer Management*, *Computer News* and *Computer Business Europe*; the U.S.' *Computerworld*, *Hot CoCo*, *inCider*, *InfoWorld*, *µ*, *MacWorld*, *Micro Marketworld*, *Microcomputing*, *PC World*, *PC Jr. World*, *Run*, *73 Magazine* and *80 Micro*.

VIEWPOINT

Management issues affecting DBMS success

THE DATA CENTER
John P. Murray

This is the fourth in an eight-part series.

The data base management system (DBMS) is not the panacea it may appear to be or is often purported to be by the software salesman. However, a sound DBMS, correctly installed and adequately supported, can become a catalyst that can be used to move the organization ahead.

A good DBMS really does offer the opportunity to deliver many of the as yet unrealized promises of management information systems to the organization. The extent to which that delivery occurs within a particular organization is tied to two critical factors. The first is that of the support for the DBMS within MIS and willingness of MIS management to assume reasonable risk to push the DBMS effort aggressively. The second factor has to do with the willingness of the organization's senior management to understand both the magnitude and the potential benefits of the DBMS effort and then to make and sustain the commitment to its success.

Note that nothing has been said about the technical issues involved in the installation and maintenance of the DBMS. These issues have not been forgotten or ignored — they are indeed important considerations — but in my view, they are not the critical issues.

Why not? Because the technology, that is, the hardware and software, have advanced to the stage where, while they can be difficult and frustrating, they are manageable. Given that circumstance, hardware and software should be considered secondary to the critical DBMS issues, which are political, emotional and managerial. Provided a competent staff and a well-chosen DBMS package, success is contingent upon those three issues.

Given that premise, the successful management of the data base environment requires a different set of skills and knowledge than that which has been the case in the traditional MIS department.

Successful DBMS environment defined

Understanding the concept of a successful DBMS environment is key. In my opinion, the successful DBMS environment is that which has set the course for and is making progress toward the following:

- An environment where as much of the organization's data as is practical (something above 85%) is resident in a data base environment. This may mean multiple data bases, but not multiple data base management systems.
- That data is, as a matter of policy, made readily available to those who have authority to use it on a basis as free from MIS constraint as possible.
- MIS clients have the use of a fourth-generation programming language and actively use that language to produce their own information.
- Clients are, with the guidance of MIS, encouraged to design and develop their own systems and to write and maintain their own programs (written, of course, in a fourth-generation programming language).
- Clients increasingly accept responsibility for the operation of their production systems.

This definition of DBMS success is not fantasy. Reaching the ultimate goal will take time, patience and money, but it is attainable. The technology is either available or coming on-stream; the real issue is that of people. If MIS is not only to realize its real potential, but perhaps more importantly, survive, the time to recognize and begin to attack these nontechnical issues is now.

Simply stating that the technology has reached, or will soon reach, the required state of evolution to make all this happen begs the critical requirement to build the strong staff (both in MIS and the client areas) to make it all happen. This is, as it always has been in MIS, a severe problem. It does, however, fall under the heading of the political, emotional and managerial problems — not the technical.

The preliminary step must be to gain the support of the organization's senior management for at least the concept of building the DBMS environment. Because of the high cost associated with the development of the DBMS environment, MIS must consider all the salient issues involved to present a cogent argument (based upon business, not technical, needs and benefits) to the organization's senior staff.

To a great degree, the success of this effort is tied to the amount of time and thought devoted to the preliminary work and the quality of the initial presentation made to senior management.

The potential benefits to the organization so outweigh the associated DBMS costs, if the process is correctly managed, that there is no reason to attempt to ignore or distant those costs in the beginning. What it will cost to do it right is what it will cost. Given the conditions of management commitment, a strong DBMS and qualified, dedicated staff, success can be assured; MIS management should be willing to stand up and say so.

Willingness of senior management

There is another facet of the DBMS issue that is important. Whether MIS management can do anything to help things in this area depends upon the particular organization. This issue is that of the willingness of senior management to understand at least the potential that is offered the organization by the DBMS.

This should not be on a technical level, but senior management should accept the responsibility to at least try to grasp the concept and to appreciate the potential.

Clearly, the issues are not likely to be considered and acknowledged unless there is a strong and concerted effort within the organization to make the data base an effective management tool. The ultimate success of the DBMS is dependent upon the leadership of the effort.

Next: The leader's role in a successful DBMS effort.

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, *published by Dow Jones-Irwin.*

Machine credentials vs. native programming skills

HUMAN CONNECTION
Jack Stone

Even though the vast majority of DP centers hire only those professionals with hardware- and software-specific credentials, I surely don't agree with the practice. It is clear to me that, for example, a programming slot should be filled first on the basis of a candidate's native programming skills. Related machine experience is well down on my list of priorities.

In the case of the operations manager position in the mainframe installation, the situation is even more obvious. I would select the candidate with the strongest management potential, regardless of which mainframe is included in his background. But in this imperfect world, the hiring policies are not set as I think they should be, and the way hiring is going, they probably never will be.

The end result? Many good people are being overlooked as operations manager material, as attested to by this letter to me from Ron Ogle in Kitchener, Ontario:

"In reference to your column, "Initiative, Not Academics, the Key to Growth" [CW, July 11, 1983], I feel compelled to comment on the contrasts between the situation of your respondent and myself.

"First of all, let me say that I do agree with the overall message of the [July 11] column, that hard work and the application of the three I's of business life — initiative, industry and interest — are extremely important. In most cases, when in concert with a high learning ability and strong intellectual capabilities, they are more significant than formal post-secondary school education.

"I, too, started at the bottom as an operator trainee after beating out over 100 other applicants for the job. I progressed to shift leader within a year (three IBM mainframes), then worked for Honeywell, Inc. and NCR Corp. (six years each), after which I spent three years with a major NCR user. One gains a great deal of knowledge about hardware and software while employed by a manufacturer. I have been in operations management since 1970.

"Several years ago, I had an in-depth psychological evaluation and received the following comments: 'Strong organizational skills, high level of technical competence, superior intellectual capability, high knowledge of management practices, innovative in solving problems, learning ability superior to 98% of supervisors' . . .'

"In my most recent position, I was responsible for one of NCR's larger virtual multiprocessor mainframes, along with two other virtual mainframes at each end of the country. All three mainframes were linked [by] data communications. My responsibilities included Syngens, system software maintenance, problem definition and resolution, operations-oriented third-party software selection, hardware selection, system performance, tuning and capacity planning and system administration.

"In spite of my capabilities and experience, I am now unemployed and have been for a while. By the time you get this letter, I do hope to be employed, but in all likelihood, I will be out of [the DP profession]. Although I have searched long and hard for an operations job and identified many that match my managerial skills, the openings are not with NCR users, and no operations center is willing to take a chance on someone without hardware-specific experience. They seem to be satisfied with hiring someone whose skills are inferior to mine, as long as the hardware knowledge requirement is met.

"I don't know if DP will miss me, but I will definitely miss DP. I'm obviously disappointed that the industry appears to be ready to lose me after all these years. It has been fun, frustrating and, in spite of the many 'all-nighters,' it has been rewarding.

"To your respondent, I wish him luck. But come to thing of it, luck shouldn't have anything to do with the operations career." ‡

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

Letters to Stone should be addressed to him at P.O. Box 33699, Washington, D.C. 20033.

VIEWPOINT

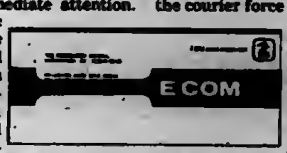
Why did Ecom fail? Unrealistic forecasts, unmet requirements

READER'S PLATFORM
Walter E. Ulrich

The U.S. Postal Service's (USPS) experiment in electronic mail is coming to an end. The USPS is looking for a buyer for its Electronic Computer-Originated Mail (Ecom) hardware. Ecom, by every measure, has been an utter failure. What happened and why?

From 1976 to 1978, studies undertaken by the Postal Service indicated there would be an important market for electronic-originated mail. The objectivity of some studies may have been tainted by the strong pro-electronic mail position of postal management. Bias has no place in market research and may be one reason why volume forecasts were unrealistic.

Computers generate a lot of correspondence. Some of it is time-sensitive, and the senders want to attract the recipients' immediate attention. Dunning letters are one example. The studies described the requirements for a new time-sensitive class of mail that would speed letters from a company's computer into the first mail stream. Unfortunately, the system the Postal Service designed in 1980 did not meet all the requirements specified by the studies.



Contract awarded

In January 1981, a contract was awarded for the development of Ecom. After negotiations with the Postal Service, the system delivered was even less than the already limited one the USPS had specified. Some of the companies that had endorsed the original concept were never able to make use of the final product. Messages were printed with black ink on white paper.

On January 4, 1982, Ecom was introduced. Ecom quickly got the reputation for being electronic junk mail. Ecom failed because of questionable market research, inferior service design and overoptimistic market forecasts.

When you read this article, Federal Express Co. in Memphis may have already announced another new electronic mail service. According to published reports, this new service will offer electronic coast-to-coast document delivery in two hours. Reportedly, pickup and delivery by Federal Express' highly touted courier force is included.

Fred Smith, Federal Express chairman, is the visionary who identified the latent demand for reliable, overnight delivery services. Market research tells him that people put documents in Courier Paks. He already sees his company as being in the communications business. What is more logical as a next step than electronic mail?

Federal Express is a consummate marketing company and conducts market research early and often. Federal Express misses the mark occasionally (remember Hotel Pak?), but its record of marketing and promotion is the envy of most companies.

The electronic delivery service's design is superior. Group IV-type facsimile machines will provide copy quality nearly equivalent to that of an office copier. Pictures, graphs and signatures will be no problem. And the courier force will ensure delivery when it absolutely, positively has to get there today.

Federal Express expects to transmit 1.5 billion documents in 1990, according to Federal Communications Commission filings. Facsimile has always been an electronic mail stepchild, and the forecast appears optimistic. On the other hand, the Office of Technology Assessment estimates 19 billion pieces of electronic mail in the same year. It is certainly conceivable that a company with the service, quality and credibility of Federal Express could achieve that level of penetration.

Market potential exists

The market for electronic mail is doubling every year. The introduction and aggressive marketing of the right products and services will blow the market wide open. The long-term success of the major communications and computer service suppliers will depend upon how quickly and successfully they stake out market share. Competition will ensure that customers have a wide range of options at a fair price.

What about the USPS? The most important thing the post office can do is to ensure that it has the best physical delivery system possible. For a generation at least, the bulk of the population will get their mail in physical (rather than virtual) mailboxes.

Electronic messages must get to people who aren't subscribers. The USPS should provide ready access to all electronic mail vendors and provide physical delivery conveniently, cheaply and reliably. ‡

Ulrich is president of Walter E. Ulrich Consulting in Houston, a management and technology consulting firm specializing in computers, communications and office automation.

SOFTWARE & SERVICES

SOFTALK
Paul Gillin
CW Senior Editor

Software shows' time yet to come

Can the software industry support a large trade show of its own? Indications from the two major new software shows of 1984 are that it can't, at least not yet.

First the good news: The Information Management Exposition & Conference for Software (Info/Software), a first-year show held in Chicago this month, drew more than 8,400 people. That is more than had been predicted by the show's promoters, the Cahners Exposition Group. Over 130 vendors exhibited, and most have reserved booth space for the 1985 Info/Software, according to

See SHOWS page 58

Unix 5.2 out for PE superminis

Firm first major player to support Unix version

OCEANPORT, N.J. — Perkin-Elmer Corp. has become the first major minicomputer vendor to announce a fully supported version of the Unix System V Release 2 (5.2) operating system. The vendor has also announced a number of optional packages that run under the new operating system.

Scheduled for October availability, Xelos, a derivative of Unix System V, runs on PE's Series 3200 family of superminicomputers. The release incorporates all features of the recently announced Unix 5.2 (CW, Jan. 23) and several proprietary PE enhancements, a spokesman said.

The enhancements include Menumaker, a user interface that can be used to create menus that customize the operation of Xelos-based application systems, and the Documenter's Workbench, a set of text processing tools, formatting macros and line drawing macros that can be used to produce documentation during program development.

Xelos provides all standard features of Unix System V, including multiuser, multitasking facilities with job control, a hierarchical file system with support for flexible access protection and shared files and record locking. C and Fortran 77 compilers, a Series 3200 assembler and a symbolic debugger are included in the operating system.

Prices for Xelos range from $1,500 for an eight-user license on PE's entry-level Model 3205 to $30,000 for 65 or more users on the high-end 3250XP supermini.

The optional applications announced today by PE include Supercomp-Twenty, a spreadsheet package from Access Technology, Inc; Mark of the Unicorn, Inc.'s Final-word and Visicorp's Visiword word processing packages; Unify Corp.'s Unify relational data base management system (DBMS); and Ryan-MacFarland, Inc.'s RM/Cobol.

Unify is said to employ an integrated design that exploits the features of Unix disk management by performing direct I/O to files. Data access speed is optimized by a variety of linking mechanisms, the PE

See PE page 60

- Interlink Computer Sciences, Inc. has unveiled a communications link between IBM mainframes and Decnet nodes/52
- Management Science America, Inc. has unbundled its Peachlink software and will sell it as a separate product/52
- Comshare, Inc. and Cortex Corp. were two of only a handful of vendors who made product announcements at the recent Info/Software show/54
- Sakman Software Co. has announced five Cobol productivity tools for Burroughs Corp. computers/56

INSIDE

SOFTLINE/GARY GULDEN and ROBERT RECK

CSF technique can apply to team management, too

The critical success factors (CSF) process is quickly becoming known as a high-quality, interview-based system design technique. Traditionally, the CSF process has been used with managers to create a management or decision support system. Now, however, Index Systems, Inc. has developed four new uses for the CSF technique that strengthens its usefulness.

The CSF process is usually recognized as a valuable method for determining information system priorities and other information that is useful in MIS planning. The CSF process was first articulated by Dr. John F. Rockart of the MIT Sloan School of Management. Originally, Dr. Rockart envisioned using CSFs with a single executive. The philosophy of the approach is that if an executive articulates objectives and the essential things that must go right to make the objectives happen (CSFs), then the important areas for information support are the measures that track performance, help analyze or model critical elements of these CSFs.

More recently, Rockart and Index have extended the process of identifying management support systems to entire teams of managers with four new uses for the CSF process:

- Focusing the information presented in an organization's current management report (or reporting) portfolio.
- Identifying, analyzing and supporting the definition of new business functions.
- Overhauling the methods and procedures of a business or organization.
- Supporting business (strategic and tactical) planning.

An organization can reap significant benefits from any one of these uses. However, taken together, these four new applications of the CSF process, along with the two conventional uses, offer a powerful basis for improving the effectiveness of managers.

The first new use for CSFs is to focus and tune up current management re-

See CSF page 60

Gulden is a vice-president and Reck a principal at Index Systems, Inc., a consulting firm in Cambridge, Mass.

Communications link ties Decnet nodes to IBM MVS

FREMONT, Calif. — Interlink Computer Sciences, Inc. has introduced an IBM user-initiated software communications link to Digital Equipment Corp. Decnet nodes for IBM MVS operating system users.

IBM MVS/Decnet Gateway reportedly enables IBM MVS batch jobs and interactive TSO users to send information to and retrieve information from Decnet nodes.

The vendor's IBM user-initiated communications software, called IFT, coupled to the Decnet user-initiated capability, called DFT, provides bidirectional information transfer.

Users on the IBM side of an integrated system can access DEC files using either TSO/ISPF (menu-driven screens), a TSO command processor or batch, the vendor said.

Additionally, IBM users can access DEC files without having to learn DEC command language, and DEC users can access IBM data sets without having to learn IBM JCL.

The product reportedly combines an intelligent front-end network processor linked to the IBM system via a high-speed data channel, along with IBM host-resident software developed by the vendor.

The Gateway product, consisting of the network controller and IBM host-resident software, is priced from $85,000, including one user-initiated link — either the Decnet-to-IBM DFT link or the IBM-to-Decnet IFT link. The price of the additional link needed for bidirectional communications is $22,000, while the batch software option is priced at $8,000.

Interlink Computer Sciences can be reached through Suite 203, 39055 Hastings St., Fremont, Calif. 94538.

MSA to sell Peachlink separately

ATLANTA — Management Science America, Inc. (MSA) has announced that it plans to market its Peachlink micro-to-mainframe communications package this fall as a separate product.

Currently Peachlink is packaged as part of MSA's Executive Peachpak office productivity series, which includes spreadsheet, word processing and graphics applications.

Peachlink is compatible through a universal interface with other micro applications, including Visicorp's Visicalc, Ashton-Tate's Dbase II, Lotus Development Corp.'s 1-2-3 and any package containing Software Arts, Inc.'s Document Interchange Format standard, according to MSA.

Additionally, MSA plans to market Peachlink to mainframe systems houses that are not necessarily using MSA mainframe applications software, since Peachlink's software automatically uploads and downloads data into the applications' own native file format.

Transferring info

Peachlink provides two different methods for transferring information. With screen transfer, the micro accesses any on-line mainframe screen for partial or whole transfer, according to need.

The second method is direct data base sharing, in which the micro requests the mainframe to ship designated files in one request. The user is not required to requeue downloaded files for micro display or for uploading to the mainframe, the spokesman said.

Pricing of the communications software is not yet available, according to the vendor spokesman.

But, according to company officials, bulk purchases will be priced in the neighborhood of $1,000 each.

MSA is located at 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

Manufacturing, data entry, MRP systems bow at AMS

Conference's product highlights include offerings from Martin Marietta, Boeing, Uniq

By John Gallant
CW Staff

CHICAGO — Martin Marietta Data Systems, Inc. unveiled the latest offering in what it called a computer-integrated manufacturing system at the Advanced Manufacturing Systems (AMS) conference here recently.

Dubbed Modular Applications System (MAS)-Financials, the system is a collection of packages designed to handle accounting, sales, procurement and inventory management, according to a spokesman. It includes eight integrated modules, which can be used separately, for general ledger, accounts payable and receivable, customer order processing, inventory management, fixed assets and depreciation, sales history and purchase order and receiving.

MAS-Financials is currently available on Hewlett-Packard Co.'s HP 3000 minicomputers, the spokesman said, and will be offered in coming months for IBM's 4300 series and Digital Equipment Corp.'s VAX-11 series. The system will be marketed as part of Martin Marietta's MAS family of software and can be integrated with the company's MAS-Personnel, MAS-Manufacturing and MAS-Payroll products.

The spokesman said the MAS-Financial modules for the HP 3000 are priced between $6,000 and $12,000. More information can be obtained from Martin Marietta Data Systems, 6303 Ivy Lane, Greenbelt, Md. 20770.

Micro data entry

Also at the AMS conference, Boeing Computer Services Co. introduced its Datamanager data entry system for IBM Personal Computers and Personal Computer XTs under Microsoft, Inc.'s MS-DOS operating system. A spokesman said the product is designed for the creation and use of interactive, screen-oriented data entry systems for distributed data processing networks.

Used as a front-end system, the spokesman said, Datamanager provides an operator interface that allows for the creation of transaction files for use on the micro or for transmission to a minicomputer or mainframe. Applications for the system are said to include order entry, insurance claim filing and other data collection activities. The system provides up to 64 edits for data validity and for restructuring data according to required formats.

The complete Datamanager system, including the screen design model, is priced at $700 per copy from Boeing Computer Services, 7980 Gallows Court, Vienna, Va. 22180.

Modular system

Uniq Digital Technologies announced its Spider II Manufacturing Resource Planning (MRP) System, which a spokesman described as a modular system of integrated manufacturing and accounting packages. The system is designed for use with the Unix System V Release II operating system on Digital Equipment Corp.'s VAX-11 superminicomputers.

Spider II supports a variety of functions, including inventory control, material requirements planning, custom order processing, standard product costing, job costing and shop floor control. In addition, the system reportedly offers word processing, financial modeling in conjunction with the company's Unicalq spreadsheet, computer-to-computer communications and electronic mail capabilities.

The full Spider II manufacturing and accounting system is priced at $70,000, the spokesman said. Uniq Digital Technologies is located at 28 S. Water St., Batavia, Ill. 60510.

SOFTWARE & SERVICES

Comshare, Cortex share bulk of product debuts

By Paul Gillin
CW Staff

CHICAGO — Only a few new products were unveiled at the Information Management Exposition & Conference for Software (Info/Software) here recently as vendors apparently held off in anticipation of the National Computer Conference to be held next month in Las Vegas.

Comshare, Inc. unveiled an IBM Personal Computer XT-based personnel record keeping and reporting system called Profiles/PC. The product is said to be functionally equivalent to a mainframe personnel system, but is geared toward companies or divisions with less than 2,000 employees. The Profiles/PC data base includes personnel, salary, job, organization, benefits and other data modules, a spokesman said. Additional modules can be added to handle specialized functions.

Profiles/PC produces more than 90 standard reports and can be used to generate customized reports via menus and fill-in-the-blanks screens. Interfaces can be provided to popular mainframe human resource packages. Users can also access Comshare's remote computing services for data consolidation and backup. The base price of Profiles/PC is $5,995 plus installation and maintenance. An introductory offer of a $1,000 discount is available before June 30.

Comshare also announced a new release of its System W decision support system that includes a fill-in-the-blanks capability for building models. Called Model-by-Example, the feature guides the user through model building visually. As many as 15 commands can be combined into a single step.

The other enhancement to System W is the addition of Datman, an integrated relational data manager. The feature allows users to handle numerical, textual and date data, make full screen data selections and queries and perform basic data management functions. System W runs under IBM's VM/CMS, MVS/TSO and PC-DOS operating systems at prices ranging from $55,000 to $143,000.

Comshare also announced Microseek Plus, a micro-mainframe communications package that allows an IBM Personal Computer or Personal Computer XT to link to a mainframe as an asynchronous terminal or as an IBM 3270 terminal. It includes file transfer, asynchronous and IBM 3278 emulation, a set of prepackaged logon sequences for automatic connection to host computers and the ability to automate repetitive tasks. Microseek Plus costs $7,000, including mainframe software and diskettes for five micros. Additional diskettes are $200 per copy. Comshare is located at 3001 S. State St., Ann Arbor, Mich. 48106.

Cortex Corp. announced Version 2.0 of its application generator, the Factory, for Digital Equipment Corp. VAX-11 processors. It contains a DEC RMS interface that supports sequential and indexed file handling and other VAX-11 applications.

Factory users can access common data elements from other existing RMS applications. Previously, RMS files had to be extracted for use in Factory applications. The Factory also includes a menu-driven guidance system.

Additional modules are available to speed up runtime, allow Factory-generated applications to run on DEC PDP-11 or Professional 350 computers and to enable the user to run applications on VAX-11s not used for applications development.

Version 2.0 of Factory costs from $10,000 to $25,000, depending on the VAX-11 model used.

Cortex is located at 55 William St., Wellesley, Mass. 02181.

SOFTWARE & SERVICES

Sakman equips Burroughs

MADISON, Wis. — Sakman Software Co. has introduced five new Cobol programmer productivity tools for Burroughs Corp.'s 1000 to 4000 series computers.

The File Maintenance Program Generator (FMPG) reportedly generates structured programs for file maintenance. It requires users to provide parameters to the generator that allow the generated program to perform update functions. The Fix Program Generator (FIXPG) can be used as a testing and debugging utility for programs, a program generator for once-and-for-all type user requests and a program generator for mass updates. It reportedly creates Cobol programs that are able to select records from a file and update or delete them as necessary.

The Profile Program Generator (PROPG) can be used as a testing and debugging utility or as a program generator for once-and-for-all type user requests. The Totaling Program Generator (TOTPG) can be used as a testing and debugging utility for the programmer or as a program generator of once-and-for-all type user requests. The Matching Program Generator (MPG) generates structured programs for matching, merging and selection-type problems.

MPG is priced at $800, TOTPG at $400, FIXPG at $1,900, PROPG at $600 and FMPG at $2,100.

Sakman Software is located at 1205 Lorath Terr., Madison, Wis. 53711.

SYSTEMS SOFTWARE

COMPUTING CAPABILITIES CORP.
Radar enhancement

Computing Capabilities Corp. has announced enhancements to Radar, its terminal network monitor that reportedly enable it to monitor any application running on a Hewlett-Packard Co. HP 3000 minicomputer.

Radar enhancements reportedly permit monitoring of applications using any programming language or terminal handler, including those using fourth-generation languages. The product enables HP 3000 users to measure actual throughput and response times on their on-line applications, a spokesman said.

Radar sells for $4,500.

Computing Capabilities, Suite 122, 465-A Fairchild Drive, Mountain View, Calif. 94043.

DYLAKOR
DYL-280 II

Dylakor has introduced a version of its English language file and information management system, DYL-280 II, for IBM DOS operating systems.

DYL-280 II includes a customized letter writer for volume correspondence, a report writer for simple or complex reports and a utility facility to handle routine maintenance tasks, a spokesman said. As an information handler, it is said to offer a large number of sort capabilities.

The system is said to have the flexibility of having logic either automatically controlled on I/O files or user-controlled, using the READ and/or WRITE command. Full support of Cobol copy members or books and/or in-stream Cobol definitions are provided, the spokesman said.

DYL-280 II is priced at $15,000 and may be leased for $240/mo on a five-year lease.

Dylakor, 17418 Chatsworth St., P.O. Box 3010, Granada Hills, Calif. 91344.

CAMBRIDGE SYSTEMS GROUP, INC.
ACF2 Release 4.0.0

Cambridge Systems Group, Inc. has announced Release 4.0.0 of its software access control program for the IBM MVS environment.

Release 4.0.0 of Access Control Facility 2 (ACF2) reportedly will offer enhanced security and streamlined installation and implementation. It provides extended CICS security facilities, while reportedly minimizing ACF2 validation and storage overhead, the vendor said.

Full screen sign-on support is provided, Multiple Region Option support is enhanced and there are new ACF command menus. ACF2 was developed by SKK, Inc. of Rosemont, Ill. The program costs $33,000.

Cambridge Systems Group, 24275 Eliso, Los Altos Hills, Calif. 94022.

B I MOYLE ASSOCIATES, INC.
BIMCNSOL

B I Moyle Associates, Inc. has announced BIMCNSOL, a package that is said to permit IBM DOS/VSE operating system users to use IBM 3270 CRT terminals under IBM's CICS as alternate- or remote-system consoles.

According to a spokesman, the system allows console messages to be displayed and console commands to be entered from CRT terminals. The package is available in a display-only version and in a full display and command input version. The full command version provides operators with the ability to control the DOS/VSE system from multiple remote locations, and it permits users to respond to their own system messages and use normal system status inquiry commands from their own terminals.

The display-only version allows review of messages previously displayed on the system console in sequence, by partition and by search argument. The display-only version of BIMCNSOL is priced at $880 for a permanent license and it can be leased for $440/year or $44/mo. The full command version costs $2,000 for permanent license and can be leased for $1,000/year or $100/mo.

B I Moyle Associates, 5788 Lincoln Drive, Minneapolis, Minn. 55436.

MACRO 4, INC.
Tubes Version 1.3

Macro 4, Inc. has announced Tubes Version 1.3, said to support multiple-CPU installations. Connecting the Tubes virtual machine on each machine via channel-to-channel adaptor or a point-to-point bisynchronous line, the product allows a user to connect to any system on any remote CPU listed in his Tubes menus screen.

Tubes is for use in IBM VM shops.

Continued on page 88

SOFTWARE & SERVICES

Continued from page 56

the vendor said, adding that the new version is compatible with all earlier releases. A BRDCAST command allows a Tubes operator to broadcast to any user group. The Hardcopy facility enables users to direct a hard copy of any screen display to the VM system printer, the vendor said.

In addition, Tubes will now automatically start the logical devices associated with all or selected program function keys when a menu is first invoked, the vendor said.

Tubes Version 1.3 leases for approximately $200/mo.

Macro 4, Millbrook Plaza, Mt. Freedom, N.J. 07970.

PRODUCTIVITY AIDS

COMPUTER ASSOCIATES INTERNATIONAL, INC.
CA-Optimizer

Computer Associates International, Inc. has announced an enhancement to its programming productivity and optimization tool, called CA-Optimizer. The new feature reportedly allows IBM VM/CMS operating system programmers to compile and optimize Cobol code either under VM/CMS alone or in conjunction with IBM DOS/VSE or OS/MVS operating systems.

CA-Optimizer provides a specially enhanced source listing that gives programmers detailed information about the program in one concise listing, the vendor said. It includes three facilities — Optimizer, Analyzer and Detector — which aid in coding, debugging, testing, quality assurance and performance.

When used in the combined OS/MVS and VM/CMS environment, or the VM/CMS environment alone, CA-Optimizer allows compile and optimization of Cobol programs, reducing the size of the object desk, providing a greatly enhanced source listing and speeding the execution of the Cobol object program under MVS, the vendor said.

A perpetual license for DOS/VSE sites, with or without VM, is priced at $17,500. The price for OS/MVS sites, with or without VM, is $42,500, the vendor said.

Computer Associates International, 125 Jericho Tnpk., Jericho, N.Y. 11753.

LINK DATA SYSTEMS
Program Generator; Link PC

Link Data Systems recently announced two products for use on the IBM System/34 and 36 and the IBM Personal Computer.

Program Generator and Link PC reportedly are designed to permit a non-data-processing individual to select information from host computer files and translate them for use on the IBM Personal Computer. The method of translation selected will optionally allow the user to transfer data to spreadsheet packages such as Lotus Development Corp.'s 1-2-3, or to be used in user-written application programs, acording to the spokesman.

No data processing experience is needed to operate the products, the spokesman said. Other features reportedly include systems security, the ability to translate packed data for use on the IBM Personal Computer, the ability to sort the output files in ascending or descending order and multiple file support.

Program Generator is priced at $395, and Link PC is priced at $95, according to a spokesman for the vendor.

Link Data Systems, P.O. Box 37, Ambler, Pa. 19002.

APPLICATION PACKAGES

BAKCO DATA, INC.
Optimum Warehouse Distribution Application enhancements

Bakco Data, Inc. has announced a number of enhancements, including full lot control, for its Optimum Warehouse Distribution Application.

The Lot Control Subsystem reportedly enables the applications to set up individual lots with expiration dates for each lot. Full inventory control for each lot can be maintained so that consolidated inventory management reports can be produced on demand, a spokesman said.

The program operates on the Hewlett-Packard Co. HP 3000 minicomputer using HP's Image data base management system. The packages utilize a fourth-generation language, report writer and screen handler.

The various modules are priced from $9,800 to $22,700, according to the vendor.

Bakco Data, Suite 190, 85 W. Algonquin Road, Arlington Heights, Ill. 60005.

HORIZON SOFTWARE SYSTEMS, INC.
Horizon Wordprocessing Release 3.4

Horizon Software Systems, Inc. has introduced Release 3.4 of its Unix-based Horizon Wordprocessing. The release includes an expanded menu of help files and a broadened range of printer commands.

The help files are designed to offer step-by-step guidance to common text-manipulation tasks, a spokesman said. Through an EXPLAIN command, the user has access to 41 categories that lead through progressively more specific steps to accomplish tasks or explain relationships between commands sets.

The expanded printer commands encompass numerous printing attributes now available on many printers, the spokesman said. The user may modify or add to the command index file for each printer.

The Horizon product has been ported to more than 35 computer systems, ranging from microcomputers to mainframes and utilizing all versions of the Unix operating system and look-alikes, the spokesman said.

Prices range from $595 to $2,395 depending on the system used.

Horizon Software Systems, Suite #821, China Basin Building, 185 Berry St., San Francisco, Calif. 94107.

TANDEM COMPUTERS, INC.
T-Text

Tandem Computers, Inc. has announced the addition of word processing capability for its Nonstop distributed processing superminicomputer systems.

T-Text, an option for Tandem's 6530 terminals, consists of special editing keys, a word processing controller board for the terminal and host software. It reportedly eliminates the need to learn complicated sequences of control characters. T-Text enables users to create, edit and print documents by pressing editing, function and object selection keys, the vendor said.

Documents created using T-Text can be distributed via the vendor's electronic mail to any combination of users, either locally or through a worldwide network, the vendor said.

T-Text is said to provide menus for creating, formatting and printing documents, or for listing documents and printing status. Other menus enable users to set edit and print profiles to an automatic default.

The T-Text terminal is available factory-installed or as a field upgrade. The terminal package, factory-installed, is priced at $400. Pricing for host software is $1,000 per processor for a one-time license fee.

Tandem Computers, 19333 Vallco Pkwy., Cupertino, Calif. 95014.

See PACKAGES page 58

To use INTELLECT, [redacted] query system, all you have to do is [redacted] English—and you'll retrieve. [redacted] text or full-color graphics.

INTELLECT, the world's only successful true natural language query system, is an ideal tool for [redacted] information center. INTELLECT's powerful information retrieval capabilities are so advanced that it understands questions and responds with answers as if you were talking to a knowledgeable colleague. Executives access data themselves—more easily than ever before—without learning any technical jargon or "computerese." It's so easy to use, it doesn't even have a training manual!

Whether you use INTELLECT as a retrieval system or as an effective data analysis tool, it transforms raw data in the data base into information and presents it in finished color graphics in a matter of seconds. It's a live dynamic interface that fully integrates your existing database and graphic systems.

Already hard at work in hundreds of organizations, INTELLECT is ideal for marketing, finance, personnel, manufacturing, and banking applications.

INTELLECT is an important technological breakthrough. You can learn more about it by attending one of our nationwide seminars. Or put its amazing power at your fingertips in minutes with one of our demonstration tapes.

Call or send coupon for more details. Look into INTELLECT, and be an eyewitness to the future of computing.

[redacted]
Tell me more about INTELLECT.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

Hardware Type _____ Info Center? _____

_____ Demo Tape _____ Seminar _____ Sales Presentation

ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 [redacted]

ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 617-890-8400

SHOWS from page 51

show management.

Now the bad news: Like Softcon, another first-year exposition, held in February in New Orleans, Info/Software failed to prove anything.

In fact, the atmosphere at Info/Software was curiously negative.

Comments from vendors and users paralleled many of those put forth by attendees at Softcon. Vendors generally agreed that the quality of the contacts they made was high. However, many groused about what they perceived as a disappointing turnout. Asked to rate the show on a one to 10 scale, most vendors rated it a six or lower.

Users were more encouraged by the placid atmosphere of the show, which they said was an improvement over the maniacal environment of a Comdex or a National Computer Conference.

Most were delighted with the opportunity to peruse products at their leisure. But nearly all of the users admitted surprise at the sparse attendance.

Both shows frustrating

Both shows were frustrating in that they failed to provide the blockbuster surprise that sponsors had hoped for.

True, trade shows take time to evolve. But the concept of a software-only show is nothing new. Softcon and Info/Software were heavily promoted by their respective sponsors, yet neither offered the definitive proof of viability that the industry has been expecting.

As one Applied Data Research, Inc. marketing representative put it, "I still don't think people understand what software is."

His statement was borne out by one look at the exposition floor. The vendors who seemed to draw the largest crowds were those like Lotus Development Corp., Ashton-Tate and Multimate Corp. that offer end-user-type software for microcomputers.

Storm clouds on horizon

Ironically, just as the software industry has begun to arouse some trade show interest in 1984, storm clouds have begun to appear.

One vendor at Info/Software suggested that the micro software industry is just waiting for an excuse to scuttle trade show exhibits. That excuse may come this November, when Lotus will sit out the mammoth Comdex show.

At Info/Software, IBM was a glaring no-show. It pulled out in late May because of "budgetary reasons" and because some planned products were not yet ready for market, according to a Cahners Exposition Group spokesman.

Half-hearted boost

Cahners has given Info/Software a halfhearted boost by scheduling a second show next year in Chicago in February.

A spokesman justified the timing by explaining that it fills the void between Comdex/Fall and Comdex/Spring and doesn't compete with any other expositions. However, a trade show held in arctic temperatures is not likely to present breakthrough potential.

Perhaps low-volume shows like Info/Software and Softcon will be the best the software industry has to offer in the coming years.

PACKAGES from page 56

DIALOGUE, INC.
DSS Graphics

Dialogue, Inc. has introduced DSS Graphics software, a package that reportedly combines graphics technology with decision support system capabilities. DSS Graphics gives users the ability to sort, select and analyze data and distill it into chart form.

DSS Graphics is said to be composed of custom graphics and business graphics systems. The custom graphics feature provides users with the ability to construct corporate logos, line and polygon drawings and structures, segments and metafiles. The business graphics feature allows users to create line, pie, bar, time and text charts.

DSS Graphics reportedly allows the tracking of a product's sales, financial operating statistics or production performance measures. It runs on all Prime Computer, Inc. models; the Digital Equipment Corp. Decsystem-20 and VAX-11/730, 750 and 780; and all IBM computers that run IBM's TSO or CMS.

DSS Graphics is priced at $5,000 until Aug. 30, at which time the price will double.

Dialogue, 19 Rector St., New York, N.Y. 10006.

SYDNEY DATAPRODUCTS, INC.
DSM Link

Sydney Dataproducts, Inc. has enhanced its Decision Sheet Modeling (DSM) software with the addition of DSM Link. DSM Link reportedly permits communications between the DSM software running on a mainframe and several microcomputer-based spreadsheets such as Lotus Development Corp.'s 1-2-3 and Visicorp's Visicalc.

DSM Link reportedly allows consolidated modeling scenarios to be developed and stored on a corporate mainframe, while 'what-if' and divisional analysis can continue to be developed in a micro-based environment.

DSM with DSM Link is priced at $35,000. DSM runs on the Digital Equipment Corp. VAX-11 and PDP-11 models, the Hewlett-Packard Co. HP 3000, the Datapoint Corp. 8600 series and IBM mainframes under VM/CMS or MVS/TSO, according to the vendor.

Sydney Development, 600-1385 W. 8th Ave., Vancouver, B.C., Canada V6H 3V9.

SOFTWARE & SERVICES

SOFTWARE INTERNATIONAL CORP.
Version 6 General Ledger

Software International Corp. has announced Version 6 of its data-base-oriented General Ledger & Financial Reporting application software package, which now includes a real-time option.

The real-time option enables users to switch on demand from a production mode to real time in order to do immediate updating of accounts, to enter and post journal entries and to perform maintenance procedures, the vendor said.

Version 6 is available for IBM OS- and DOS-based mainframes and System/34 and 38 minicomputers.

Version 6 is priced from $70,000 to $80,000 for the OS and DOS mainframes and at approximately $35,000 for the minicomputers.

Software International, 1 Tech Drive, Andover, Mass. 01810.

PRIME COMPUTER, INC.
Prime 50 series software

Prime Computer, Inc. has announced that five software packages from three vendors have been converted for use on Prime 50 series superminicomputers.

Diversified Data Collection Systems' shop floor control package reportedly automates shop floor data collection using bar-code technology and application software. It is priced at $75,000.

Aftec, Inc. converted its Pro-III package for use with Prime systems. The package is said to integrate materials requirements planning and wholesale distribution products fully. It is priced from $12,000 to $75,000, depending on configuration.

Conley, Canitano and Associates, Inc. has converted three financial packages developed by MCBA, Inc. to run on the Prime 50. These include the Future/50 General Ledger, Accounts Payable and Accounts Receivable. The packages range in price from $10,500 to $12,500.

Prime Computer, Prime Park, Natick, Mass. 01760.

DATA BASE MANAGEMENT SERVICES

HOLLAND SYSTEMS CORP.
Logical Database Design

Holland Systems Corp. has announced a software product that can be used for designing data bases using IBM or plug-compatible mainframes under IBM's TSO and MVS operating systems.

Logical Database Design (LDD) is said to provide software, procedural methodology and educational and professional support. LDD can be used on a project, division or corporate level to design stable, shareable data bases, according to the vendor.

Systems analysts use LDD to provide the operational specifications for the project. Data analysts define the required data elements, develop a logical data model and then map it to the company's overall information and data plans, the vendor said.

Users provide their views on how data elements will need to be structured for each user/system interaction. Data base analysts use the LDD results to design the physical data bases, and data base administrators review LDD results to ensure consistency with overall information and data plans.

LDD is compatible with the vendor's Strategic Systems Planning, an information resource management product for strategic information and data planning. It can also be used with other top-down information planning tools.

The product reportedly reduces subsequent data base maintenance and redesign by focusing on data elements, data relationships, "user views" and overall data planning during project specifications.

LDD runs on IBM or plug-compatible mainframes under TSO and IBM's MVS operating system. It is priced at $45,000, according to the vendor spokesman.

Holland Systems, S-303, 3131 S. State St., Ann Arbor, Mich. 48106.

UNIFY CORP.
Unify on Digital Equipment Corp. hardware

Unify Corp. has announced a contract with Digital Equipment Corp. to supply Unify's Unix-based relational data base management system (DBMS) on DEC's Professional, Micro/PDP-11, Micro VAX I and VAX-11/750 and 11/780 processors.

The operating systems that can run Unify's relational DBMS include Venture Com, Inc.'s Venix and DEC's Ultrix.

Prices start at $1,495 on low-end DEC systems and at $14,500 on high-end systems, the spokesman said.

Unify, 9570 S.W. Barbur Blvd., Portland, Ore. 97219.

LANGUAGES

RAPITECH SYSTEMS, INC.
Fortrix-C

Rapitech Systems, Inc. has announced Fortrix-C, which converts Fortran files and programs to C files and programs.

The package is said to include an integer converter, character transformer, string converter, space allocator and string parser. Fortrix converts Fortran flow control statements to equivalent C instructions at a rate of 600 line/min, the vendor said.

Fortrix-C costs $2,500.

Rapitech Systems, 565 Fifth Ave., New York, N.Y. 10017.

See LANS page 60

LANG from page 50

THE DESTEK GROUP
Destek C

The Destek Group has announced a C cross-compiler for creating Motorola, Inc. 68000 code on Data General Corp.'s Eclipse MV/4000 computers under DG's AOS(MV) operating system.

The Destek C compiler includes a compiler, assembler, linker, loader and runtime library. It can be used to produce read-only memory code or disk-based programs. The compiler is a multipass optimizing compiler and includes the full C language, a spokesman said.

The price of the Destek C cross-compiler is $9,000.

Destek Group, 890 E. Evelyn Ave., Sunnyvale, Calif. 94086.

PE from page 51

spokesman said.

A set of nonprocedural development tools are provided, including facilities for interactive data entry, ad hoc queries, report writing and data base updating, according to the spokesman. In addition, loading and unloading of data bases to and from system files allows easy interchange with other systems.

Unify will be available in the fall, with prices starting at $750 for the PE 7350 desktop system and $1,495 for the entry-level Model 3205 supermini.

RM/Cobol is an implementation of the Ansi 1974 standard and was developed for developing and executing single-user or multiuser applications on mini or desktop systems. Interactive features include screen handling, on-line debugging and comprehensive error messages.

The product includes all standard Cobol file access methods, including access to multikeyed, indexed files, the spokesman said.

For interprocess coordination, record-level data locking is provided. There is also an interface to the Unify DBMS.

RM/Cobol licenses start at $650 for the PE 7350 and $750 for the 3205.

The Supercomp-Twenty spreadsheet ranges in price from $2,000 on the 3205 to $4,800 on the 3250XP.

Finalword prices range from $1,750 to $4,300, and Visiword prices range from $1,750 to $4,100.

Information is available from PE's Data Systems Group, which is located at 2 Crescent Place, Oceanport, N.J. 07757.

CSF from page 51

ports. If the CSFs and their attendant measures are known, then available information can be added to current reports to give some critical measures and thus enhance the value of those reports. Alternatively, the CSFs can be used to cut out irrelevant data from or even to eliminate current reports. This use can be an interim step while management support systems are being developed to meet the full needs of a management team.

In an energy resources company, the CSF process was used by senior managers with the goal of developing management support systems. The process ended with the definition of three major systems. However, the managers sought immediate results for the current report portfolio to cut down the flow of paper in the business, to focus management attention on critical areas prior to the availability of the new systems and to help solve the "data rich, information poor" problem.

The measures supporting the CSFs were identified and were used as the basis for adding and deleting data from many of the reports, combining several major reports and eliminating several others. The results were immediate productivity improvement and cost savings, as well as other desired achievements.

The second new application uses the CSF framework as the basis for identifying a new organizational element or business function, for analysing the functional role within the business and how it interacts with other business units and for developing support from managers for the new organization or function.

In one business, a quality assurance function was being created. However, the function's role and required actions for success were unclear. In a brainstorming session, the manager of the new function defined the ideal mission, objectives and CSFs and realised that lateral managers needed to be involved in and responsible for quality assurance.

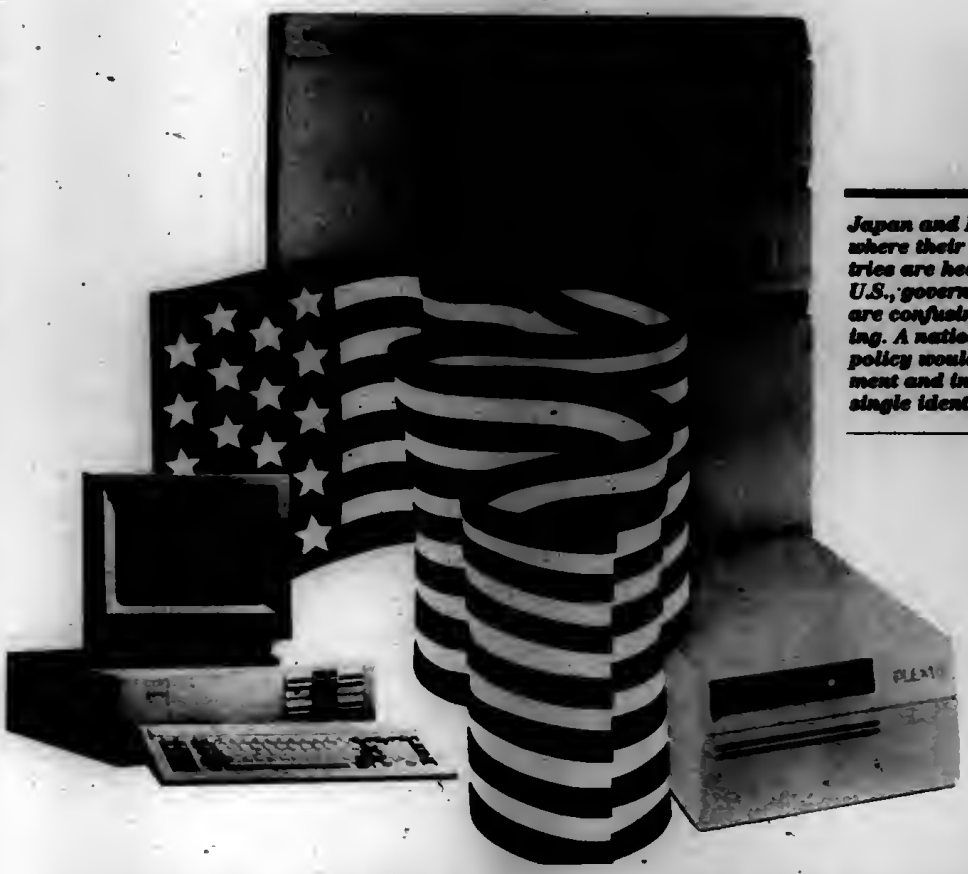
CSFs, once identified, can also be used as a basis for overhauling the methods and procedures of a business and focusing on where they are helping or inhibiting the achievement of objectives. Additionally, once critical measures are known, the business processes that support these measures or management information can be streamlined.

For example, a company with market-driven CSFs (such as "know the competition" or "get close to the customer"), but with a strong set of product development and sales controls, could use the results of the process as the basis for removing some of the controls no longer appropriate for the new thrust and orientation of the business.

Finally, a fourth use for CSFs is focusing a team of managers on the mission, objectives and CSFs of an entire organization. Management consensus regarding these factors is crucial at the start of any information system or planning project.

In one telecommunications firm, the planning process showed that the mission and objectives for the firm were not shared by the senior executives. The CSF process was used. The result was a consensus by the executives on a mission that was considerably broader than the managers' original view and a consistent and shared set of objectives and CSFs.

IN DEPTH



Japan and France know where their computer industries are heading. In the U.S., government actions are confusing and conflicting. A national computer policy would focus government and industry on a single identifiable outcome.

A United States of information

The industry and the nation need a cohesive policy

By Ben G. Matley

The absence of a cohesive U.S. national computer policy (NCP) places the U.S. computer industry at a disadvantage relative to foreign competitors. This lack of a cohesive policy has produced conflicting and inconsistent domestic laws and practices on privacy and computer crime. Industry leaders continue to call for more direct government participation.

The U.S. maintains computer policy positions, of course. But legislation, litigation and executive orders are made piecemeal, one issue at a time. The result: an imbroglio of unanticipated actions and unexpected effects, generally to the disadvantage of the computer industry.

Focusing government and industry

A comprehensive NCP study holds the possibility of developing a cohesive policy because competing interests would not be acted upon in isolation from one another. Furthermore, an NCP plan would focus the efforts of government and industry upon an identifiable outcome in the same way that the National Aeronautics and Space Administration (Nasa) provides coordination and direction as well as funding in space research. NCP studies by other nations demonstrate that Nasa's success is achievable in the computer arena.

Several nations have published position papers regarding the place and importance of computers in national life. The NCP studies from Japan and France are particularly important because of their measurable impact upon the U.S. computer industry. In the case of Japan, at least, there is no need to convince the reader that the U.S. computer industry has found a worthy and capable challenger in computer research and development.

The evidence in the case of France may be less apparent, but that is because France's NCP study dates only from 1978, whereas Japan's dates from 1972. Not only has Japan's NCP plan had more years in which to come to fruition, Japan has implemented the plan more aggressively than France. An examination of the origins and effects of those two NCP plans offer some surprises.

Japan's meteoric rise in computer R&D and in chips was not due to luck. Its success cannot be attributed to predatory designs, entrepreneurial activities or industry investment practices. Japan's rise to prominence was a direct result of

pursuing the plans laid out in the NCP study published in 1972.

The study was prepared by a think-tank organization, the Japan Computer Usage Development Institute (Masuda, Y., The Information Society, Institute of the Information Society, Tokyo, 1980.) The study recommended that Japan prepare for a leadership position as an information society by the year 2000. Titled "The Plan for an Information Society — A National Goal Toward the Year 2000," the NCP study identified nine specific areas for computer development projects, with an investment of $65 billion from 1972 to 1985. Such bold plans on that relatively short scale of time would require a domestic computer industry.

Domestic chip capability

Of course, a domestic computer industry would require a domestic chip capability. Several events followed in a fairly logical sequence:

- Joint government-industry-sponsored computer projects were planned.
- The government invested $250 million to accelerate the acquisition of chip technology, mostly from the U.S.
- Domestic markets were protected from competition in computers and communications so that a domestic industry could quickly emerge.
- A national goal was set to build the first fifth-generation non-von Neumann machine.
- Developments in artificial intelligence and robotics were pressed.

The effects of Japan's NCP plans and its successes became evident long before 1985, though many American observers perceived the situation as resulting from international business competition in computers. In fact, the nature of competition in computers and communications was rapidly changed from one of business competitors to one of sovereign competitors. Any doubt of that change can be dispelled by examining France's NCP study.

France's NCP plans derive from a premise clearly stated in its NCP study of 1978: Sovereign survival demands sovereign control of computers and communications networks, termed "telematics." Sovereign control of telematics was said to be possible only if there existed a domestic computer industry, free of foreign influence. The NCP study, translated into the *The Computerization of Society* (MIT Press, 1980) was submitted as a report to the president of France. It dealt at length with matters of computers and communications as sovereign interests.

IBM as threat

The need for a domestic computer industry led to a lengthy discussion of IBM as a threat to the sovereignty's interests. The threat applied not only to IBM France but to IBM internationally as well because of the company's expected dominance in international data transmission. A full seven pages of the NCP study's 141 pages were devoted to what was perceived as the overwhelming IBM challenge. And the study offered a remedy: the imposition of national computer standards.

Subsequent actions by France were consistent with the findings of the NCP study:

- An interest was acquired in CII Honeywell-Bull.
- Two thousand French homes were experimentally connected to telematics networks.
- Non-IBM protocol standards were defined.
- An attempt was made to have the Common Market countries adopt similar protocol standards.
- Protectionist trade practices were initiated in computers, communications and data.
- Treaties were sought on international data flow.

While it does not necessarily follow that European antitrust charges against IBM relate to France's NCP, France raised a vigorous voice in promoting that action as being in the interests of all European Economic Community (EEC) members.

Whatever the motivation of European nations in that action or the perceptions of France, the EEC antitrust actions against IBM are having a telling effect, as indicated by IBM's request for U.S. government help in resolving the matter. Once again, a knowledge of NCP studies reveals the trend toward a computer industry increasingly composed of sovereign competitors and not solely business competitors.

Since the U.S. has not made a comprehensive NCP study, it has found no sovereign role — either as partner to industry or as competitor to sovereignties. Various U.S. governmental entities have not been consistent in computer-related actions, either intra-agency or inter-agency.

At the international level, a series of on-again, off-again embargoes of computers sold to the Soviet Union is said to have provided only a disservice to the U.S. computer industry.

Ironically, numerous bills to ensure the privacy of computer criminals' records have passed over the years.

At the same time, less stringent rules on computer trade with other nations provide a number of connections through which illegal computer shipments go to Iron Curtain countries.

Other computer crimes, of the domestic variety, are easily perpetrated (indeed, playfully perpetrated) with little risk of detection and apparently less risk of prosecution and prison sentences. The notion that something of value purloined (for example, CPU time or data in transit) presents a prosecutable criminal act seems to have been lost along the way in computer crimes. Jurists have called for special laws to define computer-related crimes. A series of bills for that purpose failed in the U.S. Congress from 1979 to 1983.

Criminal privacy laws

Ironically, numerous bills to ensure the privacy of computer criminals' records have passed over the years. Criminal privacy laws outnumbered all other categories of privacy legislation. It seems a contradiction to refer to "categories" of privacy legislation, when this usage refers to personal data privacy. Why not a personal data privacy bill that covers all personal data? Assuming that our society desires to preserve personal data privacy, then the type of personal data and the medium of storage would not seem to be the critical variables.

That omnibus approach to privacy legislation, however, failed when HR 1984 (aptly titled) was introduced in the U.S. House of Representatives in 1975. Thereafter, privacy legislation was passed by category. Criminal data privacy was accounted for in authorizing legislation for the old Law Enforcement Assistance Administration and recently for the National Crime Information Center.

Financial data privacy was accounted for in authorizing legislation for the electronic funds transfer system over several years, in piecemeal fashion, until the Federal Reserve reported that those privacy and reporting provisions soon were in conflict with one another. Adherence then became impossible. Medical data privacy, school data privacy and other special categories were similarly accounted for with special category legislation. A cohesive and comprehensive view of personal data privacy would seem in order.

Automation of work, and national policies affecting such, likewise reveal

Hewlett-Packa surge in office

Discover the Personal

It's a place where personal computers, office software and distributed computer systems merge. As a result, people find their individual productivity surging to new heights.

The Touchscreen Personal Computer—the HP 150 is a key part of the Center. It's made personal computing much easier and faster. And now we've combined its flexibility with the versatility of the latest office software and the power of our HP 3000 family of distributed computer systems.

Each Personal Productivity Center can be shaped just the way you want it by adding other office and computing products from our extensive range. You can link managerial and secretarial workstations. Create impressive presentations, merging business graphics and word processing. Store everything on disc files. And get finished copy from laser printers and color plotters.

Your people will also have access to a greater variety of software. Besides the leading PC programs like 1-2-3™ from Lotus™ and popular word processing packages, they can use

rd touches off a productivity.

Productivity Center.

HP 3000 software like our exclusive DeskManager. This combines electronic mail, quick memo writing, personal filing and calendar functions.

Through a Personal Productivity Center, people can interact with similar networks in other parts of your company, as well as your mainframe. And, as you grow, these Centers can expand to handle more than 100 workstations. Without any software conversion.

So if PCs alone are making your people more productive, just wait till you see them all working together. And you can see them right now by calling your local HP sales office listed in the white pages. Ask for a demonstration, and check out our special offer in effect through July 31.

Or write for complete information to Hewlett-Packard, Dept. 003191, 19447 Pruneridge Avenue, Cupertino, CA 95014.

Productivity. Not promises.

HEWLETT PACKARD

competing and conflicting interests, each viewed one at a time. Full employment legislation dates back many years; automation certainly mitigates against full employment in specific sectors such as automobiles and general manufacturing. Unions are asking for a national policy on job security in the face of accelerating automation. The General Accounting Office (GAO) calls for a stronger federal presence in promoting automated manufacturing. Clearly, these are competing and conflicting interests, which are not best considered in isolation of one another.

The greatest concerns for the U.S. computer industry are only now being placed on the national agenda, notwithstanding the very weighty concerns considered to this point. Leaders of the U.S. computer industry are beginning to call for relief for the industry from the effects of the actions of the sovereign competitors.

The U.S., with no explicit position paper on national computer policy, is backing into a position on computer privacy that is exactly the same as that of Japan and France, which arrived at their respective positions directly by their policy studies.

Changes in antitrust laws are said to be needed so that computer firms can pool their R&D efforts, thus competing better against Japan. Several firms have already formed a joint research organization and now wait to see whether the Federal Trade Commission will look the other way. And the National Science Foundation states that federal funding of supercomputer development is needed in the interest of national security.

On the societal side, civil libertarians express concerns reminiscent of the National Data Bank debates of the early 1960s over the fledgling National Driver Register and the proposed National ID card system. The latter is a supreme example of conflicts that arise when a single "problem" is attended to in isolation from competing and conflicting interests.

The proposed National ID system is given as a solution to the problem of illegal aliens hired in place of citizen workers. The legislation would place heavy penalties upon employers who knowingly hire illegal aliens. Citizen workers would be given National ID cards; illegal aliens would not.

Yet years ago, a government privacy study specifically addressed this point and opposed a universal identifier. The study said: "American culture is rich in the belief that an individual can pull up stakes and make a fresh start, but a universally identified man might become a prisoner of his recorded past."

That report provided the foundation for the contents of the 1974 Privacy Act and the privacy acts of several states. And now, in 1983 and 1984, piecemeal legislation stands ready to violate a central tenet of that report.

Conflicting interests surrounding computer trade, R&D, manufacture and use can be resolved with reason only by considering all their interrelationships.

It is most fascinating to observe that the U.S., with no explicit NCP position paper, is backing into a position on computer privacy that is exactly the same as that of Japan and France, which arrived at their respective positions directly by their NCP studies. That position, as derived from the Japanese NCP study, foresees a "Copernican turn in privacy," meaning that personal data privacy will vanish into centralized data banks on citizens.

The French study referred to the need for a "new right to access" personal data on all citizens. Of course, the first step to accomplish that Copernican turn and to make good that new right to access is to establish a national personal ID system.

It is revealing to observe that the Congress defeated the National Data Bank funding bills in the early '60s out of concern about the amount of personal data that would be transmitted around the country in telecommunications networks not entirely secure, in addition to the concerns about national IDs. But a recent report from the GAO displayed a map of the U.S. showing the nationwide connections of only three federal telecommunications networks. The map appeared as the surface of a ball of string.

The way to resolve these conflicting interests surrounding computer trade, R&D, manufacture and use is to consider their interrelationships. A cohesive U.S. national policy is necessary if this country is to play a proper role as sovereign computer competitor and understand the effects of computer-related events upon the domestic society.

About the author

Ben G. Matley is a professor in the Department of Mathematics and Computer Science at Ventura College, Ventura, Calif. He is also a lecturer in computer science at West Coast University's Graduate School in Los Angeles.

IN DEPTH

Software's next dimension

Until now, we have programmed the user to exploit the machine. In the future, we must reverse the process — program the machine to exploit the potential of the mind. That is knowledgeware.

By Forest Woody Horton Jr.

Product developers of artificial intelligence, expert systems and gateway software (for searching commercial data bases) are not thinking boldly enough.

Software exploits the power and versatility of machines. It not only helps us "do the thing right," it also helps us "do the thing well." But that still isn't enough. We must also learn to do the right thing.

That is where the next great advance in software — "knowledgeware" — comes in. Until now, we have programmed the user to exploit the machine. In the future, we must reverse the process — program the machine to exploit the potential of the mind.

If we consider the dual-faced image of Janus, the ancient Roman god of gates and doorways, software might be thought of as the left face, looking toward the machine. Knowledgeware might be visualized as the right face, looking toward the mind, or the brain.

Neither hardware nor software sprang full-blown onto the drawing boards as new product families. Each group of Information Age tools follows the classic product life cycle curve. Software, hardware and knowledgeware borrow ideas, component processes and component technologies — know-how from older generation products that matured, declined and even became obsolete.

Knowledgeware, in short, is gradually evolving from hardware, software and other roots and ideas. And as we move into a knowledgeware era, we will still need even more and

better hardware and software, not less. But over a very long period, there is a melding of earlier stages into later ones — for example, transistor tube computer mainframes into chip technology-based mainframes.

Another phenomenon characteristic of technology life cycles might be called "secondary re-births." That is, even after a product or family of products matures and begins its decline, there are often one or more spinoffs (perhaps "spurts of new growth" is a more appropriate phrase), in which a new generation of products comes into being. For example, in the case of hardware, a new and exciting fifth generation of computers is springing up.

Hardware, unlike buggywhips, will never "die" or become obsolete, although experts may argue as to whether the decline is relatively sharp or gradual — nor will traditional software disappear altogether. Just as many of the ideas, component processes and component technologies involved in hardware design, manufacturing and marketing were bootstrapped into software design and into manufacturing and marketing as well, so undoubtedly will software know-how be bootstrapped into knowledgeware products (for example, more humanlike command languages). The question is not whether the bootstrapping takes place, but which know-how, when, how much and how fast.

Hardware, software and knowledgeware operate, I believe, to satisfy different levels of spheres of human physiological and psychological needs.

Figure 1 juxtaposes human physiological and psychological needs on the one hand with human information needed to meet those basic needs on the other. The way the two pyramids relate to one another can be illustrated with the lowest or most basic level: coping information is needed to help human beings satisfy their simplest biological needs. Coping information resources include both manual and automated information systems, counselors (family, religious, social, financial, legal and so on), educational and learning resources.

Abraham Maslow's pyramid model reinforces the notion that basic survival needs must be satisfied before the more materialistic, social and higher order spiritual needs can be addressed. The search for intellectual values and satisfaction, such as inner self-realization, must wait, according to Maslow, until the substantial satisfaction of the lower order needs.

I believe it can be argued that hardware and software have helped us to move up from the lower order levels to the middle ones. But knowledgeware will be the key to allowing us to move up the pyramid even further to the higher levels.

Nearly all coping information resources have benefited from a wide variety of computer and telecommunications hardware and software. For example, emergency 911 services in most major cities are now computerized and tied into telecommunications networks. Computer-rated dispatching systems allow the call taker to identify the police or other emergency vehicle nearest the scene. The calls are checked against a geographical base file that verifies the legitimacy of the address.

Where video systems are coupled with such computer-based emergency service systems, additional screens can tell whether the nearest emergency vehicle is a one- or two-man car or whether it is equipped with life-saving equipment such as a respirator or burn treatment unit. Very substantial hardware and software backup is now commonplace for such emergency service systems, including systems on the order of the Modular Computer Systems, Inc. Modcomp 4 and IBM 370/158, with supporting operating, utility and application software packages.

Such computer-based applications directly support the need for coping and helping information resources. They also help us move up the pyramid from the first to the second level and, to a lesser extent, from the second to the third.

When we move up to level two, a higher order group of computer-based applications can be found, but still employing fairly commonplace hardware and software, albeit with better price/performance and more sophistication. For example, every local government, not to mention state and federal agencies, has several dozen different kinds of income security, health/medical and other entitlement programs. At the federal level, Social Security and Medicare are two obvious examples.

Each program depends on extensive information systems for efficient administration. Indeed, it has been argued that none of these large-transaction-volume programs could even exist today without those technologies.

I would argue that for the most part, this category of applications directly supports level two, helping information, in the Figure 1 schema — and, to a lesser extent, level three.

But what of hardware and software that begin to break the barrier between levels three and four? Here we begin to run into more difficulty, for the products and technologies are not advanced enough in design, nor are the potential applications of those products and technologies so obvious. Nevertheless, there are some examples.

For one, some of the newer on-line data base searching aids can be classified here. Here are some examples, picked because they illustrate the category, not necessarily because they are superior.

IBM's Intellect (developed by Artificial Intelligence Corp.) has been touted as a user (command) language that, in the company's words,

"breaks through the barriers that limit access to computer-based data and lets you get the information you need for making informed decisions, and all with the normal English you use every day." The particular quality that moves this software product closer to the knowledgeware category is the ability to enhance the basic starting vocabulary with self-defined synonyms, terms used in personal data bases and industry- and application-specific terms. It can group certain data items, such as defining "New England" to mean the set of six specific states.

Knowledge Man is another example, offered by Micro Data Base Systems, Inc. Its promotional thrust is aimed to "outthink the competition." That is, it claims to offer greater capabilities in such areas as the maximum number of tables that are open at once, while storing and retrieving data, querying multiple tables with a single command, multilevel sort breaks and so on. In the spreadsheet area, the company claims the product can construct a cell in the worksheet that can extract data from independent tables, and the cell can be an entire program. In the screen construct area, the product can do format-a-time processing.

In the on-line searching arena, Menlo Corp.'s Insearch and Information Access Corp.'s Search Helper both deserve mention. The latter introduced the basic idea that a search could be set up in a public library environment much like a vending machine operation. That is, you put your dime or quarter in and out pops the candy bar (completed search, in our example). The former product has the virtue of treating material being worked on as if it were in a file folder and being able to "consult itself" without having to use print or other intermediary command tools, having once stored search results. In a manner of speaking, Insearch has the ability to translate between sophisticated and unsophisticated users.

We should also mention Dialog Information Services, Inc.'s Knowledge Index and Bibliographic Retrieval Services' After Dark. The former is command-driven, the later menu-driven. They both function as bridges between the big systems and such services as Compuserve and The Source.

But all of these level 3-to-level 4 transitional software product claimants have as their Achilles' heel the presumption that the user has a fairly sophisticated level of on-line searching knowledge, has already defined his problem, has some fairly good idea of what he wants and is already to a large extent computer-literate.

Instead, knowledgeware product designers must assume just the opposite: that the user is unsophisticated, has not thought out his problem well, if at all, and has little if any idea what information may exist to satisfy his requirements. The user may be not only computer-illiterate but also downright antagonistic toward machines.

A significant part of the problem is that we are tending to think of third-generation tools of the mind (knowledgeware) as simply the most modern state-of-the-art version of the same basic kind of software we were producing in the '60s and '70s. Some observers have called that genre of software products the brute force variety. That is, the mindset of their designers was to shove tons and tons of data through a machine as input. And, on the output side, we would get still more tons of data, but of course refined, reorganized, reassembled and so forth.

In the '70s we began to wise up a little to that mindset (too much data, not enough information), and the concept of the management information system was born. Presumably we learned also to apply other relevant modern management concepts like management by exception.

Then on-line data bases and personal computers came along, and we were diverted to cope with how to educate larger and larger fractions of the general population to the efficacies of the machine. The excitement of on-line data bases diverted large portions of the scientific and

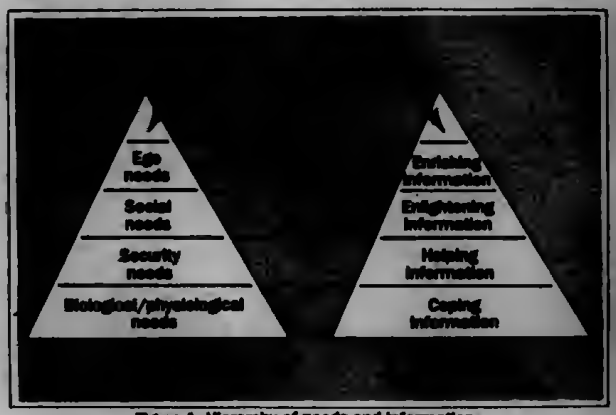


Figure 1. Hierarchy of needs and information

technical information community to dealing with the problem of creating efficient automated indexing, storage, search and retrieval algorithms.

The verb "divert" is used deliberately here to underscore that while these important breakthroughs were taking place, somehow we seemed to have forgotten the mainstream information organization and management problems that were still with us and needed to be resolved. We paid a high price for that diversion of skilled manpower. While progress in micro software has indeed been spectacular, it has come at the expense of moving state-of-the-art knowledge forward for dealing with some very old information handling problems like indexing.

Automatic indexing is one area in which few breakthroughs have occurred in the last several decades.

Yet most experts seem to agree that if we are to capitalize on new hardware developments such as optical disk technology we must make greater strides to confront longstanding and fundamental information indexing and other information management problems.

Knowledgeware must implicitly herald a return to dealing with the basic information management challenges of both the past and the future. Notice I've said "information management," and not so much "management information." The cleverest software in the world will become increasingly inappropriate if it intends to fulfill "predetermined" information needs of users instead of helping them help themselves.

By contrast, the knowledgeware of tomorrow should not overwhelm us with an information architecture that dictates to us, "These are your critical information requirements." Instead, knowledgeware must say to the user, "My virtue is to help guide your searches wherever they may lead."

The 15 parameters listed in Figure 2 illuminate the similarities and differences between the three "wares." Current developmental efforts diverge from this model primarily in the first four areas on the list.

For example, most of the new software product announcements quickly get into data management, spreadsheet analysis, statistical presentation and the ease of performing various computational algorithms and functions. At the same time, these promotional materials stress the use of easy-to-use "plain English" languages. Of course, all of these features, along with mouses, windows and all the rest are useful, but they do not address the discovery and learning challenges at the heart of knowledgeware.

Instead, current software products simply capitalize on imaginative and versatile data, picture and image manipulation and display techniques and technologies (including the employment of a few darn good "tricks").

At the same time, one group of products, so-called gateway software, is making inroads into the challenges of searching on-line data bases (both internal and commercial), challenges that, once again, are not to be minimized. They are large in number and extremely difficult. Cross-data base searching, for example, is fast becoming a reality, with the newer "invisible" or "transparent" products that simplify and automate the oftentimes tedious and time-consuming identification, log-on, connect, use and log-off protocols.

The knowledge gateway system (KGS) to information access [CW, Dec. 5, 1983] is an example of yet another knowledgeware product that is still on the drawing boards but promises to become a reality in prototype stage before too long.

While nearly all expert systems being developed today (or already operational, such as Mycin) are built upon an existing body of knowledge in a particular field (chemistry, medicine, geology), there is yet another possibility for expert systems. They can help users to learn, discover and find out what information resources even exist, how they may be accessed and how they may be used effectively.

At one level, the KGS may be

Figure 2. Tools to help thinking

thought of as an expert system in which the "expert" is an interdisciplinary team of experts, and the data base is a repository of knowledge and wisdom that has been accumulated over the years by such professionals as reference librarians, educational and media experts and cognitive psychologists.

Unfortunately, to the best of this writer's knowledge, few other examples of knowledgeware prototype products exist. Perhaps they do exist, but as closely guarded corporate trade secrets until launch onto the market.

In the interest of conserving space and time, we will not address each of the 15 parameters in Figure 2 individually. There is plenty of room for argument in every one of the areas covered. I would urge the reader, particularly software product inventors and designers, to look at them both individually and collectively.

While it is perfectly understandable why software houses are pushing to bypass the intermediary online search community and reach out directly to the personal computer end user (the market will be 10,000-fold more profitable), knowledgeware products for the end user do not involve merely making searches invisible or transparent to the user. Those are certainly important and worthy goals, but shouldn't be regarded as the only, or necessarily most important, ones.

In addition to the product examples we offered earlier, in this area, all the following products have the potential to be transformed in future editions from purely stage 2 software products to stage 3 knowledgeware products: Sci-Mate (Institute for Scientific Information), Visilink and Data Kits (Visicorp/Data Research, Inc.), Microdisclosure (Disclosure, Inc.), and Dow Jones services such as the News/Retrieval service, Market Analyzer, Market Microscope, Market Manager and Investment Evaluator.

As end-user computer literacy gradually improves and spreads, can the thirst of users for more and more data, information and knowledge be far behind? If we try to prestructure answers for them with clever software instead of teaching them how to help themselves, we're going to be confronted with an even greater rebellion of the kind that we faced in the '70s, when central MIS computer center clients became so disenchanted with the service they were getting.

About the author

Forest Woody Horton Jr. is a Washington, D.C.-based consultant who specializes in information management.

Once again, AT&T delivers.

AT&T Information Systems announces the arrival of AT&T System 75. It's our first fully integrated digital communication and information management system for the mid-sized market (40 to 400 stations).

Even though our newest arrival is mid-sized, it gives you many of the same advanced capabilities that larger companies needing greater station capacity enjoy with System 85. And because it's from AT&T Information Systems, you get all the heritage and expertise that come with over 100 years of experience. That's why it's the one

[illegible] System to choose when you've got to be right.

You can select one or more of these six management areas that make System 75 take after its big brother:

Voice Management—over 150 voice features, accessed through a wide variety of modular terminals, can be customized

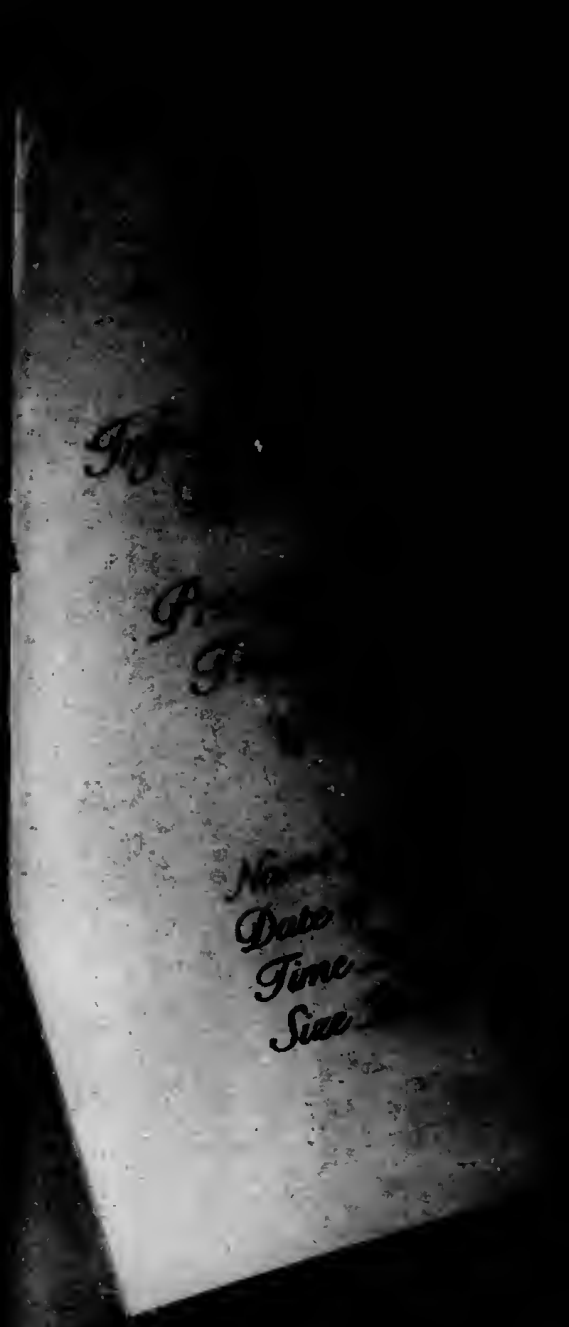
[illegible] your needs.

Data Management—[illegible] System 75 controller processes and converts digital signals providing simultaneous voice-data transmissions at selected speeds up to 64 Kbps.

Network Management—provides control over the routing of all your calls, both voice and data, to outside locations. It has many configurations that can link switches within a building, across the street, or across the country.

Office Management—includes an

IT HAS ITS BIG BROTHER'S FEATURES.



integrated leave word calling system and a company-wide directory that can streamline everyday office procedures into one system and increase productivity.

System Management—gives you control over your system with a hands-on ability to make changes as they happen within your company.

Building Management—monitors energy, security, and safety control applications for your facility. Saves money by controlling energy consumption and reducing possible losses due to theft.

As you can see, System 75 is not only mid-sized, its prominent features give it a striking resemblance to its big brother. Which is not surprising considering it was developed by systems designers from AT&T Bell Laboratories and manufactured with the same quality and reliability you've come to expect from AT&T.

System 75 incorporates Information Systems Architecture, the design principle that ties our products together and provides for future expansion and system integration. What's more, this mid-sized system is backed by the largest, most experienced nationwide staff of sales and service specialists in the industry. For more information on System 75, call 1-800-247-1212, Ext. 326.

If you're looking for a mid-sized system with all the features of a large one, System 75 delivers big.

WHEN YOU'VE GOT TO BE RIGHT.

AT&T
Information Systems

ADDS STACKS UP BEST

Designed for Operator Enjoyment.

The leader in quality and reliability now offers the Viewpoint family with all the most user-requested features:

- Earth-tone colors and small size to complement any office environment.
- Tilt and swivel display for operator comfort.
- Low profile keyboard with adjustable height for easier data entry.

VIEWPOINT®/Color.
The first truly low-cost color terminal.

VIEWPOINT®/90.
OEM's delight. . .double-high/double-wide, split screen, programmable function keys, down-line loadable, and more.

VIEWPOINT®/78 and VIEWPOINT®/78 Color.
IBM functionality in monochrome and color.

VIEWPOINT®/60.
A fully featured editing terminal.

VIEWPOINT®.
Best price/performance in a conversational terminal.

VIEWPOINT is a registered trademark of Applied Digital Data Systems Inc.

ADDS
Applied Digital Data Systems Inc.
A Subsidiary of NCR Corporation

100 Marcus Boulevard, Hauppauge, NY 11788 (516) 231-5400

Framingham, MA (617) 875-2337 · Philadelphia, PA (215) 564-0135
Atlanta, GA (404) 458-7120 · Dallas, TX (214) 387-2337
Shaumburg, IL (312) 843-7555 · Tempe, AZ (602) 968-0950
Tustin, CA (714) 730-6700 · Palo Alto, CA (415) 856-0560

IT ALL ADDS UP.

IN DEPTH

CLASSIFIED

Where the jobs are

Demand for computer professionals rose dramatically in the past year. Both user and vendor companies are offering alternative career paths to attract and keep talented staff.

By Wayne D. Emigh

The first half of 1984 brought a sharp increase in demand for computer professionals in technical, marketing and management positions. Aggregate demand for January through May is up by 36% over the same period in 1983 and 48% over 1982.

Openings for software engineers and developers, particularly those with Unix and C language experience, increased by a dramatic 300%. At the same time, the need for programmer/analysts with a background in relational data bases has more than doubled. Programmers as well as analysts with a combination of micro, mainframe and mini experience are being sought by more than four times as many companies as in 1982, coincident with the rapid growth of in-house, microcomputer-supported distributive systems.

An experienced data processing executive today can aspire to the same opportunities in general business management as his peers in finance, engineering or sales. Employers consider ideal an MBA degree combined with undergraduate experience in accounting, finance, engineering or computer science.

Moreover, MIS executives can expect parity in compensation with other equivalent-level executive positions within their companies. In fact, according to the latest computer salary survey

conducted in 55 geographic areas by Source EDP, more than 240 top computing executives now earn in excess of $100,000 annually.

As the economy improves, DP professionals are moving or being transferred more frequently. The proportion of people changing employers and relocating 50 miles or more fell from a prerecession level of 30% to approximately 16% during the recession. The rate has rebounded to 26% and continues to rise.

In some areas, reductions in the ratio of housing costs to overall income have helped. So has the resurgence of the financial services, banking and automobile industries, which now must staff up to make up for lost time in applying information systems to corporate needs.

The limited time available to many of these companies to fill their overdue staffing needs often forces them to recruit outside their immediate geographic areas. And as demand for their skills continues to rise, DP professionals feel more confident in their ability to relocate and succeed in a new area.

The Sunbelt still receives the most net in-migration of computer professionals in spite of the fact that the energy companies in those areas have not yet resumed their systems expansion and aggressive hiring of the late '70s and early '80s. Energy industry centers such as Houston, Denver, Tulsa and Alberta have not yet returned to prerecession hiring levels.

The Midwest is experiencing a strong resurgence of demand for information systems staff. According to the California research firm SRI International, the heartland of the U.S. should create seven million new jobs by 1990, with a high proportion in the computing field. The Midwest is home to more than 300 of the top 1,000 companies in the country. The Cincinnati/Dayton area, in particular, is emerging as one of the leaders in the Midwestern economic revival, with the demand for computer professionals overall up 36% from last year.

Although California's Silicon Valley and Boston's Rte. 128 are still among the leading hardware/software technology centers and continue to spawn entrepreneurial start-up companies, Dallas and Austin, North Carolina's Research Triangle, Phoenix, Atlanta, Toronto and San Diego are also fast becoming high-tech strongholds. Firms in these areas are seeking people with specialized skills in communications, personal computer networking, data base and a wide variety of applications and systems software technology, along with the more usual general business and industry data processing disciplines.

Western Pennsylvania has lagged behind the rest of the nation in demand for computer specialists. The steel industry's weakness has affected other dependent industries. Pittsburgh, however, remains the third largest headquarters for Fortune 500 companies. Carnegie-Mellon University is a leader in robotics research and development, and there is a high demand throughout the Pittsburgh area for individuals skilled in C and Unix.

While geographic trends are significant, even more noteworthy are the number of new developments in technology that are behind two of the most significant trends to emerge in the past few years. These are the emergence of the personal computer within the business, industrial and military environments and the proliferation of software products for advanced-capability applications.

Many organizations are looking more to consultants and to outside proprietary software vendors for help. Software sales have quadrupled in just the last three years and are expected to reach more than $10 billion this year. U.S. corporations bought 50% more software packages last year than in the previous year, accounting for 8% of the average current data processing budget, up from 6% in 1980.

Hardware vendors are realizing the need to provide more software products in order to promote the marketability of their hardware. Hewlett-Packard Co., as an example, has increased software research and development budgets fivefold (to $38 million) in the past three years, while simultaneously acquiring three independent specialty software houses. In a variation on this trend, certain joint marketing agreements are being created, as

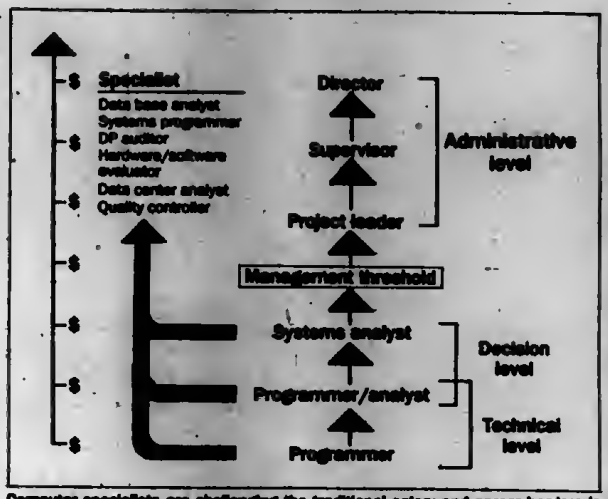
IN DEPTH/WHERE THE JOBS ARE

in the case of the recent compact between IBM and Comshare, Inc., involving the sales and implementation of decision support systems.

What this means to the computer professionals is greater and more diversified opportunity than ever before. Because of the demands for broader applications of both computer hardware and software, new career opportunities continue to develop, not only in the traditional end-user environments, but also at an even more rapid pace within the applications and systems software technology areas. Industry estimates indicate that today there are well over 3,000 independent software companies providing a variety of products to hardware vendors as well as to the end-user market.

An interesting phenomenon is occurring as part of the evolution of data base management software systems. The more advanced systems of today are finally able to perform with the sophistication and capability that were often proclaimed, but seldom delivered, in the early days when these systems first became commonplace.

Paradoxically, new application generators being implemented today are making it too easy for systems developers to design non-data-base-oriented applications through direct links to CICS-type conventional file systems. This trend, while not yet widespread, is becoming more commonplace as these generators gain a greater foothold within the user environments. As a reflection of this development, Source EDP's recent survey of hiring found that the greater proportion of openings for data-base-oriented personnel are for technicians rather than managers.



Computer specialists are challenging the traditional salary and career barriers in the information systems environment.

The proliferation of microcomputers is the other half of the leading edge in technological trends. In 1975 there was virtually no commercial microcomputer market. By 1980, micros held 6% of the total $29 billion of new hardware shipments in that year by U.S. manufacturers worldwide. Industry predictions are that in 1985 micros will compose 20% of a total $63 billion market and by 1995 will dominate then projected sales of $313 billion with a 55% market share. If these predictions hold, then microcomputers will have achieved a market level of more than $170 billion from a standing start, in only 20 years.

The majority of software products to support these systems are yet to be developed, yet software technology has come a long way in only a few short years. For example, AT&T has jumped into the fray with its six new 3B series computers. Each relies on the Unix operating system, which itself is rapidly receiving wide industry acceptance and is almost a de facto standard in some areas because of its flexibility and multiplexing capabilities. Coincidentally, in systems software, in multiuser networks and in high technology, the C language is gaining wide use.

As the personal computer has grown in acceptance within the business environment, it has, in turn, contributed to the erosion of use of outside time-sharing services and/or the traditional service bureau. Alternatively, those vendor organizations likely to have the most promising future are either those concentrating on aggressively expanding their library of marketable software products or computer utilities that have developed a major data base with broad market appeal and easy accessibility by customers.

The parallel trend toward greater in-house micro utilization is being driven by the relatively low cost, the attraction of personal and ready

access, and the fact that many applications adapt well to these systems. Many micro users believe that these systems are actually more versatile and more cost-effective than other options. Within Source EDP, we're observing a trend toward more entry-level opportunities for individuals well trained in Basic on the IBM Personal Computer and to a lesser degree with other micros. It appears that these demands will increase with time.

Another persistent development in the computer field today is the establishment of the information center within the computer department of many larger companies. These centers serve a number of purposes which vary by company.

Some companies have established an executive systems group for the specific task of providing advice and training to users in the acquisition and implementation of small and/or personal computers. Other companies form applications development centers to interface between the user departments and the computer department's application development teams, as well as explore ways of increasing the productivity of programmer/analysts.

While demand for computer professionals continues on the upswing, opportunities at the entry level remain relatively limited. By itself, the technical or trade school education has little value as a door opener in today's job market. A college degree is often the minimum credential needed in order to break into the field.

To keep pace with the advancement of computing technology and its applications, a number of new jobs are being developed. With the proliferation of new software and hardware products has come myriad opportunities for software designers and developers, software engineers, quality assurance analysts and implementation specialists, in a number of areas.

In the user environments, a diversity of career paths is emerging, particularly at the specialist level, offering career growth and financial rewards heretofore available only at management levels. An example is Flying Tiger, the major Los Angeles-based transportation company, which has established the position of technical specialist.

Management Information Systems Director Lee Mitchell says, "This new position was created to provide an attractive career path for the senior person with highly developed technical skills who does not aspire to a management responsibility. This person assumes the role of internal consultant and enjoys a salary range comparable to certain management levels within the department."

As at Flying Tiger, new hierarchies of responsibilities are evolving in most larger companies and include specialties ranging from systems programmer, DP auditor and data base specialist through quality assurance specialist, security analyst, hardware/software evaluator and data center analyst. Of course, each discipline may engender its own management hierarchy depending on size and importance within the company. The figure on ID/17 depicts alternative career paths which enable many specialists to circumvent the traditional limits of compensation and responsibility.

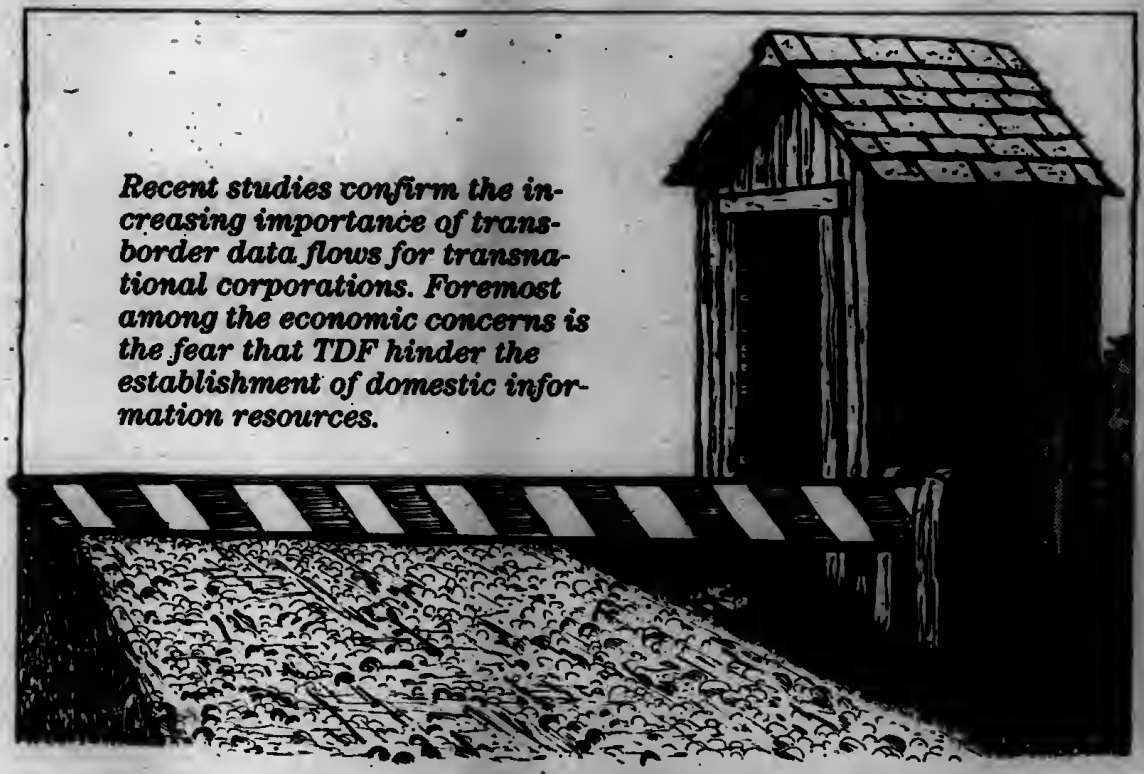
As batch-oriented environments become almost passe, employers are more regularly expressing a preference for people with on-line, data base and/or personal computer experience. Paradoxically, while demand for computer professionals continues on the upswing, opportunities at the entry level remain relatively limited. By itself, the technical or trade school education has little value as a door opener in today's job market. A college degree is often the minimum credential needed in order to break into the field. Academia is responding to this demand by developing curricula that answer the needs of the technologically oriented student as well as the individual focusing on a computer-oriented business career. Colleges and universities vary greatly in their offerings. One major Midwestern university's school of engineering offers a B.S. in computer engineering emphasizing true software physics and hardware engineering, while the college of arts and sciences is simultaneously conferring degrees in computer science. The latter curriculum stresses languages, data base management, structured systems design and computer-assisted business problem analysis.

Within the vendor ranks, the general product line sales representative is in higher demand than the specialized product representative. Also, since vendors' offerings include a greater array of turnkey, install-it-yourself or retail store products, the demand for traditional marketing support-oriented systems engineers has leveled off. Conversely, there is still a strong need for product implementers and trainers.

About the author

Wayne Emigh is vice-president and general manager of Source EDP in Mountain View, Calif. Prior to joining Source EDP in 1968 as manager of the Los Angeles branch, he was director of corporate information systems for Dart Industries.

IN DEPTH



Recent studies confirm the increasing importance of transborder data flows for transnational corporations. Foremost among the economic concerns is the fear that TDF hinder the establishment of domestic information resources.

The growing dependence on transborder data flows

By Karl P. Sauvant

Corporate transborder data flows (TDF) account for the bulk of international data traffic. A recent study prepared by the National Telecommunications and Information Administration for the U.S. Senate observed: "International data communications have become crucial to the operation of U.S. multinational companies." This observation is echoed in a recent report by Business International, which concluded that transnational corporations "are dependent on the computerized flows of information to conduct their business today — and will be more so tomorrow."

Few publicly available studies, however, survey the use of TDF by these corporations. The principal ones have been undertaken by the Organisation for Economic Co-operation and Development (OECD), the Intergovernmental Bureau for Informatics (IBI) and Business International (BI). The primary objective of all three studies was to ascertain the uses and corporate effects of transborder data flow. They differed, however, in their samples and methods of implementation and are not necessarily representative. Nonetheless, they are indicative of corporate experience with transborder data flows in a large number of firms, and they are consistent in terms of their findings regarding the importance of TDF, the principal uses of these flows and the benefits that they provide for the firms that utilize them.

Eighty-eight percent of the companies participating in the BI survey stated that TDF were important or very important for at least one corporate function, a percentage that increased to more than 90 when managers were asked to predict importance for 1988. The principal obstacle to the growing use of TDF appeared to arise from inadequacies of the telecommunications network, particularly in developing countries. The IBI survey found, for instance, that 36% of the responding corporations planned to establish computer communications systems as soon as local conditions permitted; 29% indicated that such systems had already been established.

Laws and regulations, on the other hand, appeared to have little influence on the growth of TDF at the present time; 44 of 62 companies that evaluated this matter in the BI study did not believe that such actions affected locational decisions. This finding is corroborated by the OECD study — according to which, on a scale of 0 (no obstacles) to 2 (severe obstacles), laws and regulations scored 0.6 on the average — and by

Reprinted from the spring 1984 issue of The CTC Reporter, *a publication of the United Nations Centre on Transnational Corporations.*

the expansion of transnational computer communications systems in Brazil.

The three surveys also agreed on the relative importance TDF have for various functional areas of corporate activities, allowing, of course, for variations by sectors. Financial management was by far the corporate function in which TDF were mostly used (see table on ID/21). In the OECD study, financial management accounted for 43% of total TDF use, reaching, however, 64% in services. In the case of the BI study, 60% of all transnational corporations surveyed rated these flows as important or very important in 1983, and 73% gave them those ratings for 1988.

That evaluation did not differ substantially between U.S. and Western European firms, although the latter reached a rating of more than 80% for the future importance of TDF in this area. Financial management was followed relatively closely by marketing and distribution (including ordering, inventory control and invoicing) as far as its perceived importance to users was concerned, although the volume of flows involved was smaller.

TDF are a major element in the process by which transnational corporations take advantage of new technological possibilities and adjust to the changing economic environment.

TDF were also considered quite important for production (especially in extractive industries), management (including strategic planning) and research and development (especially in some manufacturing and extractive industries), but less so for personnel and payroll management. Noteworthy are the relatively high ratings for manufacturing, strategic planning and computer-aided design, manufacturing and engineering (CAD/CAM/CAE). The last function, in fact, had the highest growth rate in the BI study: Almost twice as many companies as in 1983 expected TDF to be important in this corporate activity within five years. However, TDF were also expected to grow in importance in virtually all other activities in most industries.

The benefits these corporations derive from the use of TDF lie, first of all, in the area of increased corporate efficiency. In the BI study, 40 of 65 firms that addressed this issue stated that corporate efficiency had increased as a result of the use of TDF; 25 did not address the effect on efficiency directly, but felt that their companies had to use TDF since these flows had become a necessary tool to do business internationally; only one firm indicated no increase in efficiency.

For one-third of the responding firms, TDF opened new business opportunities — for example, in the area of foreign exchange management and the creation and sale of data bases — and 18 used these flows to introduce new technologies in production.

Technological edge

Put into a broader context, TDF are a major element in the process by which transnational corporations take advantage of new technological possibilities and adjust to the changing economic environment. More specifically, the OECD study suggests that the use of TDF has had three major efficiency implications: First, it has epcouraged greater integration within corporations, increasing the specialization gains ensuing from closer international interdependence. Second, it has expanded the international supply of new services, such as access to computerized data bases and on-line software maintenance, accelerating the diffusion of technological advances. Third, it has improved financial management in transnational corporations.

The picture that emerges from all three studies is that these corporations rely considerably — and increasingly — on transnational computer communications systems. They do this not only to send messages faster (for example, for ordering, marketing, distribution, invoicing, sourcing), but also to improve management information (which cuts, of course, across all areas, but is of particular importance in such corporate functions as financial control, strategic planning, inventory control).

Another result is to change the manner in which corporations actually engage in production activities (for example, in manufacturing, research and development and CAD/CAM/CAE).

The impact of TDF

The impact of TDF on countries is likely to be profound and multifaceted. However, this impact has neither manifested itself clearly nor been the subject of much empirical research. All that can be done at this stage is, therefore, to identify some issues and

IN DEPTH/TRANSBORDER DATA FLOWS

discuss possible implications for research. In doing this, attention focuses mostly on possible problems associated with TDF, because they could prevent the full realization of the benefits.

These benefits are wide-ranging. For corporations — be they from developed or from developing countries — TDF permit more efficient management in an uncertain and unpredictable environment. But the benefits extend beyond the corporate sphere. The developments in information and telecommunications have substantially increased the ability to handle large amounts of data and, therefore, have improved the possibilities for better-informed decision making concerning virtually all matters. Particularly important in this context is access to a rapidly expanding pool of up-to-date knowledge stored in automated data bases. For instance, growing data networks may allow better management of natural resources (through the use of on-line commodity-quotation data bases) and facilitate access to information of importance for export and import purposes, technology transfer and the like. Better knowledge in these areas may strengthen the bargaining capacity of developing countries.

The use of TDF also may facilitate the transfer of information resources — especially data bases and software, but also hardware and information skills — to developing countries, may permit the establishment of new industries, such as data base services, and may help prevent a widening of the gap between the "information rich" and the "information poor."

A final point that deserves mention is the impact of TDF on the competitive position of enterprises in developing countries. These enterprises may also wish to consider how they can utilize these flows profitably to increase their competitiveness in the world market. This applies also to the phenomenon of closed user-group networks such as Swift and Sita. It may well be, for instance, that it is almost a precondition for banks from developing countries wishing to play a role in international financial markets to be linked to the closed user-group network of their own industry (or, alternatively, to have their own corporate networks).

To the extent that such networks are emerging in other industries as well and that firms from developing countries are not linked to them, their competitive position may suffer. Conversely, to the extent that domestic enterprises use TDF, they may be able to improve their competitiveness with respect to transnational corporations and in world markets.

The potential problems raised by TDF also relate to a wide spectrum of issues. Some of them cut across all groups of countries, some are mostly the concerns of importers of data and data services, while others primarily pertain to exporters.

Privacy concerns were among the first to be linked to TDF; in fact, they served to focus attention on that phenomenon. In response to the increased use of automated data bases containing information about individuals, national laws and regulations were adopted to ensure the individual's right to privacy.

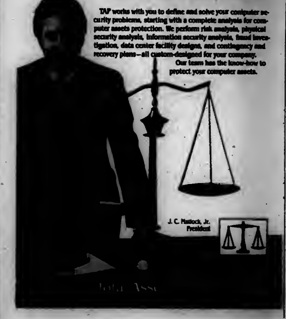
The advent of TDF led to the fear that those flows could be used to circumvent national regulatory actions. International approaches

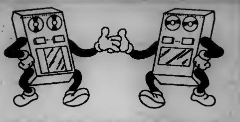
	1983				1988			
	38.6	57.7	45.4	38.6	71.3	80.7	38.6	73.0
	38.6	34.6	27.3	31.3	34.6	46.2	38.4	38.2
	38.6	30.8	18.2	28.1	30.8	30.8	27.3	30.6
	16.4	28.1	–	16.7	23.1	30.8	–	21.4
	18.5	7.7	9.1	11.2	17.3	15.4	9.1	16.7
	38.6	30.8	45.4	30.8	48.3	34.6	45.4	40.4
	34.6	30.8	45.4	34.6	40.4	30.8	54.6	48.1
	21.2	18.2	36.4	22.5	30.8	19.2	36.4	30.8
	11.5	28.1	18.2	15.7	11.5	23.1	18.2	15.7
	3.8	3.8	–	3.4	3.8	11.5	–	5.6
	38.6	26.9	27.3	33.7	44.2	46.2	36.4	43.8
	34.6	23.1	18.2	28.2	44.2	34.6	18.2	38.2
	19.2	7.7	27.3	18.0	34.6	11.5	27.3	27.3
	17.3	7.7	–	13.4	30.8	11.5	9.1	22.5
	13.5	7.7	–	10.1	15.4	11.5	18.2	14.6
	38.6	15.4	18.2	24.7	44.2	26.9	27.3	37.1
	15.4	30.8	18.2	19.1	28.0	30.8	18.2	30.8
	9.6	–	9.1	6.7	13.5	–	18.2	10.1
	25.1	26.9	9.1	22.5	32.7	30.8	18.2	30.9
	21.3	7.7	–	14.6	30.8	11.5	–	15.0
	25.1	11.5	9.1	18.0	28.8	15.4	9.1	22.5
	52	26	11	89	52	26	11	89

a. Percentage of companies that consider TDF to be important or very important for specified corporate activities.
b. Several companies appear to have subsumed foreign exchange management under portfolio management.
c. Applies to banking/finance, transportation and information service companies.

Source: Business International

Importance of TDF by corporate activity and region, 1983 and 1988 (percent)





were sought to forestall such possibilities and reconcile legitimate national concerns about privacy with a shared commitment to the free flow of information. The results were the Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data, adopted by the Council of OECD on Sept. 23, 1980 and the Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data, adopted by the Committee of Ministers of the Council of Europe on Sept. 18, 1980.

In the preparatory work for these instruments, most of the principal problems related to TDF and privacy issues were identified, and agreement was reached on them in the ensuing negotiations.

With the adoption of this regulatory framework, attention has shifted to other issues:

If internationally available information resources are more competitive, local users will prefer international to nascent domestic resources, making it difficult for domestic infant industries to grow and to develop forward and backward linkages.

- Technical matters, such as standards and protocols, which are mostly dealt with by the International Telecommunication Union.
- Legal issues, such as intellectual property rights and liability questions and the right to have access to local public telecommunications networks. Some of these issues are dealt with by the United Nations Commission on International Trade Law and OECD.
- Sovereignty issues (the concept of informational sovereignty, especially in relation to remote-sensing data, has been formulated in this regard).
- Cultural identity.
- Vulnerability.
- Barriers to the flow of data and data services, including those arising from telecommunications regulations.

Finally, and perhaps most important, TDF have given rise to a range of economic issues, especially in relation to their developmental impact. Underlying the economic concerns are two factors: the structure of the international data market and the importance of information resources.

Most information resources are located in the developed market economies. The overwhelming share of the research and development related to information resources, of the infrastructure for TDF (the manufacturing of information hardware and software and the coverage of data networks) and of the commercial application of TDF is located in those countries.

The developing countries are mostly suppliers of raw data and consumers of processed data, that is, information. This uneven distribution of information resources and the TDF associated with them must be viewed against the growing importance of microelectronics and the role of the information sector in all economic activities. Inadequate national information resources and limited participation in TDF are, therefore, regarded as being of strategic economic importance, especially for the future development and competitiveness of the national economy.

Transnational corporations play a key role in the international allocation of information resources.

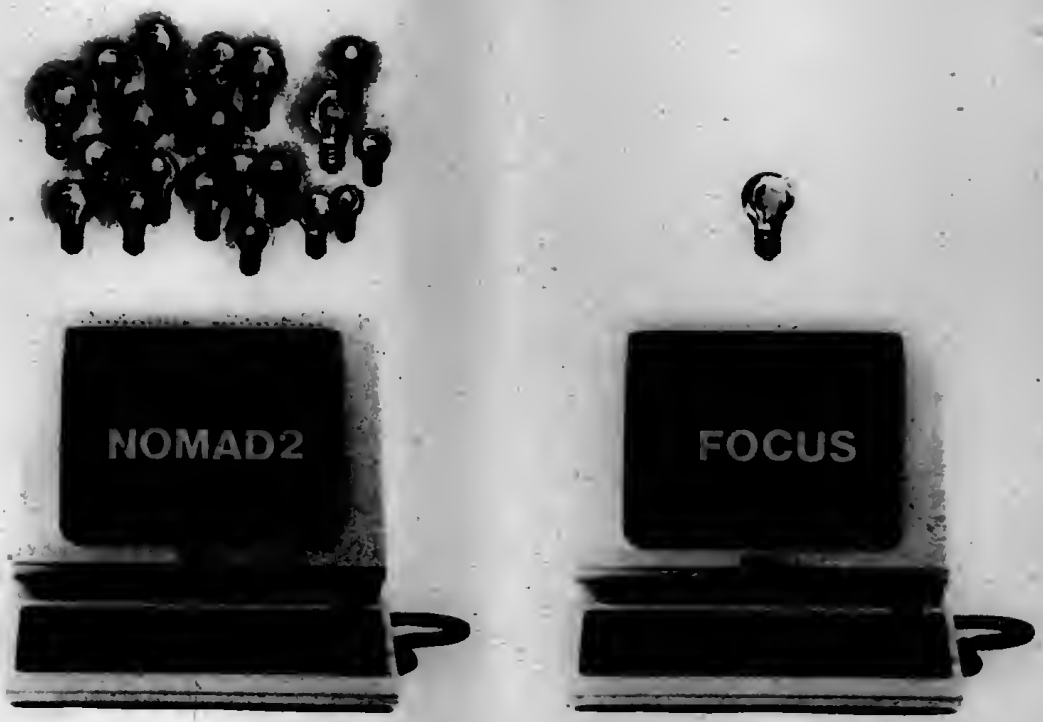
As the policies of such countries as France and Brazil indicate, those considerations apply to developed and developing countries alike and can even become part of considerations of national security.

Foremost among the economic issues is the fear that TDF hinder the establishment of domestic information resources. To the extent that some information resources are available elsewhere (including in headquarters of regional centers) and can be accessed easily, market pressure to establish domestic information resources may be reduced. If internationally available information resources are more competitive, local users will prefer international to nascent domestic resources, making it difficult for domestic infant industries to grow and to develop forward and backward linkages.

This situation, in turn, may have implications for a country's employment picture and balance of payments.

Another set of economic concerns relates to the role TDF play in areas other than information resources. Since those flows are being used in a broad range of economic activities, the lack of domestic information resources may increase the dependence (and vulnerability) of domestic industries in general. This may be particularly accentuated in the area of technology. While TDF certainly permit better access to information resources available worldwide, they may, at the same time, decrease the incentive to develop indigenous technological capacities.

The role of transnational corporations in these processes deserves particular attention because they are the principal actors in international economic relations, are almost entirely headquartered in developed market economies and account for



NOMAD2
The Smarter Software

If you're presently evaluating FOCUS, take a closer look at NOMAD2 and you'll be surprised at how smart software can be.

Whether your comparison is based on specific features, the scope of the product, or the sheer power it puts into your Information Center or your development activities, NOMAD2 is smarter.

Relational? Yes! Interactive? Yes! English Commands? Yes! Procedural? Yes!
Analysis? Yes! Multilayers of Security? Yes!
Modeling? Yes! Statistical? Yes! Graphics? Yes!
Runs on VM? Yes! Runs on MVS/TSO? Yes!

And we don't just drop a tape on you and walk away. Education, documentation, service and support are part and parcel of the NOMAD2 offering. Talk to us before you make your decision and your decision will probably be the smarter software. . . . NOMAD2.

For more information please fill out this coupon and mail to:

Roger Cox
D&B Computing Services
187 Danbury Road
Wilton, CT 06897

or call Roger at (203) 762-2511

Name _____ Position _____

Company _____

Address _____

City _____ State _____ Zip _____

( ) Phone _____

NOMAD2... Experience the difference

D&B Computing Services

a company of
The Dun & Bradstreet Corporation

the overwhelming share of commercial and corporate TDF. Hence, they play a key role in the international allocation of information resources.

The present structure of the international data market, combined with the importance of TDF, leads to the concern that the developing countries may remain blocked in the evolution of the international division of labor at those future activities that are comparatively less sophisticated and have fewer spin-off effects (such as research and development).

The role of transnational corporations is also important because the intrafirm international division of labor of these organizations is a microcosmos of the international division of labor. It may be that within transnational computer-communications systems, less sophisticated information activities are located in one set of countries (for example, the mere inputting of data), while the more sophisticated ones are undertaken in another set of countries. That this fear is not entirely groundless is suggested by data pertaining to Canada and data generated by the BI study. It has been estimated that a vast majority of Canada's TDF involves data flows from foreign affiliates in Canada to parent corporations abroad, mostly in the U.S.

The increased use of TDF, especially for corporate production functions, may affect the international division of labor, even if data flows permit better access to sophisticated information resources located in developed countries.

The BI study found that foreign affiliates in developing countries typically send their data to headquarters or regional centers located in developed market economies, which may suggest that the imbalance here is even stronger than in the case of Canada.

The increased use of TDF, especially for corporate production functions, may therefore have an effect on the international division of labor, even if data flows permit better access to sophisticated information resources located in developed countries.

The intention is not to fault transnational corporations for taking advantage of the possibilities offered by the new information technologies. It is rational corporate behavior to improve efficiency, which, as demonstrated earlier, TDF are generally credited with doing. Often, in fact, transnational corporations have little choice in their location of information resources, since local skills and the telematics infrastructure are too weak to permit the competitive location of certain activities in developing countries. However, a vicious cycle that reproduces itself as an outcome of basic market processes can only be avoided by strengthening local information resources, in many cases on a selective basis.

This objective will normally require the adoption of appropriate government policies at the national and international levels, some of which may affect transnational corporations. Without these policies, many countries, especially developing ones, may not be in a position to benefit fully from TDF (particularly if they do not have an adequate infrastructure), and they may be more prone than not to regard TDF with suspicion and as a threat to their economic development.

Over the longer term, TDF — if seen as part of broader developments in microelectronics, informatics and telecommunications — may contribute to far-reaching changes in the locational determinants of foreign direct investment. The crucial factor here is automation. While automation is a development much broader than TDF, its internationalization as an ongoing interactive process is effected through TDF. The accelerating automation of production may erode one of the principal comparative advantages of most developing countries, the abundant supply of inexpensive labor.

Indeed, the question would have to be raised whether it would still remain attractive for certain foreign-direct-investment projects to be located in developing countries. Even to the extent to which transnational corporations invest in developing countries, however, certain corporate activities may increasingly be undertaken remotely via TDF and hence not be transferred to the host country. TDF thus may affect the ability of developing countries, especially those that lack an adequate telematic infrastructure, to industrialize successfully and remain competitive in world markets, altering patterns of international investment and international trade in goods and services.

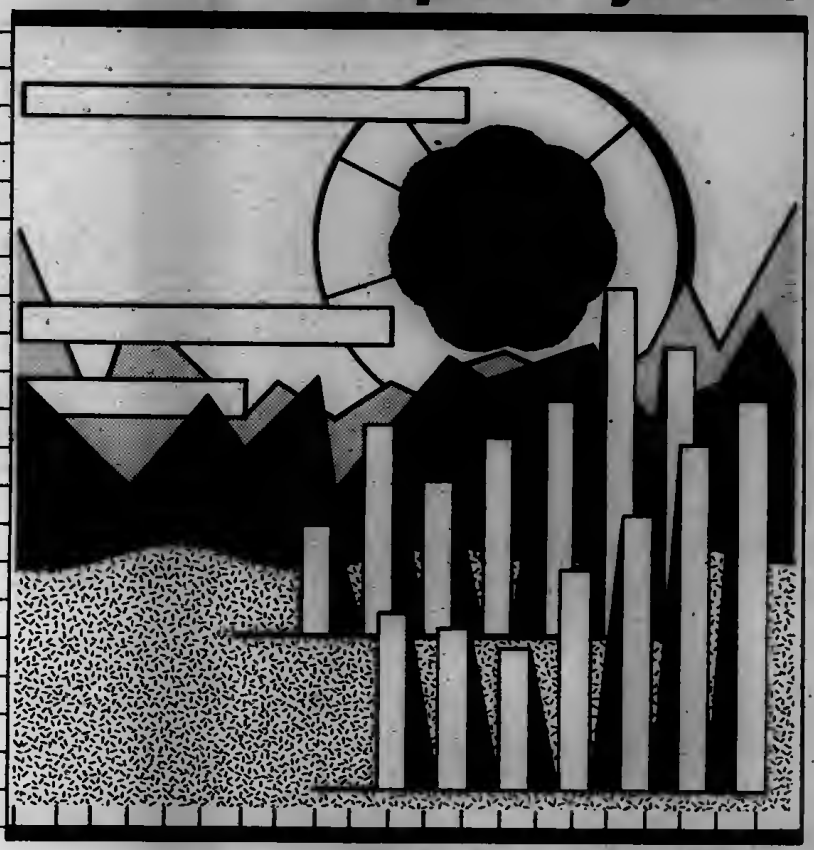
These broader interactions between TDF and the overall restructuring of the world economy must be taken into account in the formulation of policy responses that aim at dealing with the concerns associated with TDF while improving the opportunities to harness the positive effects of these flows for the development effort.

About the author

Karl P. Sauvant is the project officer within the Centre on Transnational Corporations for the center's project on transborder data flows. The Commission and the Centre on Transnational Corporations are the focal points within the United Nations system for all matters relating to transnational corporations.

SPECIAL REPORT

Graphics Systems

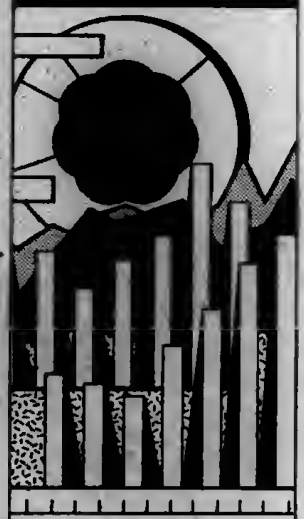


More than pretty pictures

June 25, 1984

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

INSIDE



The colored rose on the cover of this Special Report is the creation of Nancy Blumenstalk Mingus, a DP training consultant based in Williamsville, N.Y. Mingus generated the rose on an IBM 3033 running MVS/TSO from an APL program using calls to Graphpak. The design was drawn on an IBM 3279 color graphics terminal and printed on an IBM 3287 color printer.

NAPLPS demands conservation tactics

By Richard H. Veith
Special to CW‡

At the center of a crowded, windowless work area at National Broadcasting Co. headquarters in New York are three special graphics terminals. Throughout the day, artists and writers take turns using the terminals to create the pages of illustrated news and feature stories that are broadcast as NBC Teletext, NBC's year-old teletext service. In addition to their creative concerns, these artists and writers must worry about bytes.

Teletext is a technique for inserting digital pulses into a television signal without affecting the television picture information. At the receiving end, decoder modules in or attached to television sets can be used to transform the digital stream into selectable pages displayed on the television screen.

The need to make the most of each byte in the graphics and text displays stems from a number of factors, including the size of the transmission path, hardware considerations at the transmission end, hardware limits at the receiving end, software parameters in the page management system and characteristics of the graphics standard used — the North American Presentation Level Protocol Syntax (NAPLPS). The NAPLPS specification is an Ansi standard established for videotex and teletext applications.

In practice, most of the factors affecting the total number of permissible bytes per page are more or less fixed. In standard broadcast teletext, a maximum of 1,680 data bytes can be transmitted per second using one scan line in the television picture signal.

The NBC network is currently using two scan lines, yielding an effective data rate of about 26.8K bit/sec. Put another way, for teletext pages of 1,500 bytes, two pages are broadcast per second, which is a reasonable rate for cyclic teletext, given the current capabilities of the decoders at the television sets.

The production staff, using AT&T graphics terminals (AT&T's Frame Creation System for NAPLPS graphics), can actually create pages that well exceed the 1,800-byte limit. Thus, on occasion, much time is spent modifying and recreating a graphics display in order to reduce the byte count of the page while maintaining the desired level of artistic sophistication. This is especially true when a completed design exceeds the limit by only a few bytes.

More and more people are attempting to come to terms with the production of fine graphics in a byte-conscious environment.

Most teletext and videotex systems face the same or similar constraints on page size, and therefore more and more people are attempting to come to terms with the production of fine graphics in a byte-conscious environment.

Within NAPLPS, as implemented on the AT&T frame-creation terminals, there are several ways to minimize the number of bytes used, but the most desirable procedures are those that do not sacrifice artistic quality. Obviously, bytes can be reduced by removing graphics objects in whole or in part, although this could result in a less defined and less exciting display. But other procedures are possible.

If an object is to appear on a page a number of times, bytes are not necessarily saved by using the COPY command instead of redrawing the object. While the use of the COPY command saves production time, it usually has no effect on the number of bytes used. For irregular objects, however, the byte count could be affected because each additional drawing might not have exactly the same characteristics as the previous version had.

Using a LINK command is equivalent to establishing a macro, so copies of graphics objects need not exist individually, but rather as separate calls to one macro. There is an overhead, however, of about 20 bytes to establish the macro. Therefore, for low-byte objects, it is not helpful to use the LINK or macro feature. If an object has more than eight bytes, it can become advantageous to use LINK for additional copies, depending on how many copies and how large (that is, greater than eight bytes) the original object is.

In NAPLPS, Ascii text is always defined within a text block, an imaginary rectangle outlining the set of characters in any given block. A text block can be as small as one character or as large as the screen. The first thing to know about text blocks is that the defined area is always a rectangle, and blanks count as bytes. It is usually not helpful, then, to mix long lines of text with short lines. Two or more text blocks can be used, with no effect at all on the resulting display except for a smaller byte count.

Another consideration with text is that there is a 14-byte overhead to establish a text block, and bytes are added for line feeds. Characters

See NBC SR/8

Veith is operations manager for NBC Teletext in New York.

Modular graphics can fill in until standards arrive

By Phil Neray and Shahpoor Shayan
Special to CW‡

Much has been written about the emergence of graphics standards, and it is not surprising that many users are confused by the bewildering array of acronyms — Core, GKS, NAPLPS, VDI and others.

Unfortunately, the standardization process is a slow one, with the average time for a standard to become official now approaching several years. Many standards are still in the proposal stage, and in the meantime, users must choose among systems that may or may not conform to future standards.

But users need not quit in despair. Instead, they should look for graphics software systems that implement existing standards whenever possible and are based on modular graphics architectures that will allow the incorporation of future standards as they are approved.

A modular graphics architecture should ensure that the system is extensible. Extensibility means that the system can easily incorporate future standards without affecting application software that has already been written. It also means that the system can support different output devices like high-resolution video screens, pen plotters and dot matrix printers.

Finally, an extensible microcomputer system can also be easily programmed to emulate existing graphics terminals or newer terminals like the North American Presentation Level Protocol Syntax (NAPLPS) terminals used for videotex applications.

A modular graphics architecture must define two interfaces — the programmer interface and the virtual device interface (VDI). The third interface, known as the physical device interface, is unique to specific devices such as pen plotters or video bit-map displays.

Graphics application programs are written with high-level calls to a graphics library, known as the utility layer. The programmer interface is a set of rules that define the functions in this library and rules for communicating with it.

Library routines are used for commonly used graphics functions — drawing circles, adding color or scaling a picture to fit into a given area. These routines do all the work associated with generating a graphics image, letting the application programmer concentrate on the application itself.

The two most commonly used programmer interfaces are the Core system and the Graphics Kernel System (GKS). While the Core system has been in use for a longer period and has been implemented on most mainframes and minicomputer systems, the GKS system is expected to become an official Ansi standard late this summer.

The primary benefit of standard interfaces like GKS and Core is the portability of applications. Software developers, whether in-house or third-party, want to run their software on various operating systems with a minimum of conversion effort. High-level interfaces like Core and

See STANDARD SR/8

Neray is graphics product manager and Shayan is engineering manager for Digital Equipment Corp.'s Professional 300 series.

Thematic mapping prepares to break out of its niche

Microcomputers, business graphics let users take advantage of cartographers' tool

By Donald F. Cooke
Special to CW2

Geographers and data analysts have been producing thematic maps by computer for more than 20 years. The current boom in business graphics and microcomputers is dramatically lowering the barriers to widespread computer mapping of data.

However, as this field grows, more and more difficult problems must be overcome to make further progress. Nevertheless, present obstacles will be overcome, resulting in millions of people routinely using mapping by the end of the decade.

Thematic mapping is the graphics display of any kind of information, or theme, for the purposes of locating events or objects, detecting geographic patterns or displaying flows from one area to another. For example, consider a map with an "X" at the location of each 24-hour automated teller machine; such a map incorporates point data. Another map, with counties colored according to population density, uses area data. A third map, a map of the world with arrows of varying widths showing patterns of crude oil shipping, uses line data. The category names are a normal part of the cartographer's vocabulary.

How do we use such data to make maps with a computer? There are five elements to thematic mapping by computer:

- The data to be mapped.
- A computer.
- An output device.
- Mapping software.
- A cartographic data base. The cartographic data base is simply a special data file that relates each data observation to its spatial location in terms of either latitude and longitude or some other coordinate scheme.

A surprising amount of data can be mapped because of some locational aspect of the information. For example, an employment record contains a home address of an employee, and a traffic accident record includes the location of an accident. The Census Bureau publishes billions of bytes of data tied to geographic locations as small as a city block. Even the Yellow Pages records the address of each listed establishment. But none of this data can be mapped directly by any existing mapping system; the location identifier (the address or block number) must be related to spatial coordinates first.

Any microcomputer set up for business graphics can do computer mapping. In fact, the current emphasis on graphics, evident in the design of computers like the Apple Computer, Inc. Macintosh, makes some microcomputers ideal for mapping.

No longer do we have to plot maps on line printers. We now have a wide variety of better and cheaper options. While pen plotters cost tens of thousands of dollars in the 1960s, they are common for one or two thousand dollars now.

Besides pen plotters, mappers now use film recorders, ink jet plotters and electrostatic laser and dot matrix printers to display publication maps. Another option that was not available in the 1960s is the ability to interact with a color map displayed on a CRT terminal. The ability to preview a map before printing it saves time and often replaces the need for hard-copy output.

Until only a few years ago, most mapping software was developed and distributed by universities. The most notable examples included Harvard University's Symap, Calform, Aspex and Odyssey systems. These systems often included facilities to let the user create and manipulate the coordinates needed for mapping; Symap, for instance, included a specially calibrated ruler for measuring mapping coordinates.

An obstacle overcome

For years the largest obstacle to the growth of computer mapping was the need to get out the Symap ruler every time you wanted to map a new area. The solution to this problem came first from the government and later from the private sector, in the form of general cartographic data bases containing the coordinate information necessary for mapping whole classes of data.

A cartographic data base provides the linkage between the data to be mapped and the spatial coordinates needed by the mapping program to display the data in the right place on the map. The cartographic data bases must be in a form appropriate for mapping the data.

For example, to map county data, the cartographic data bases should consist of a string of coordinate measurements around the boundary of each county. To map the Yellow Pages, the cartographic data bases must consist of short street segments with low and high addresses delineated by endpoint coordinates, from which individual address locations can be interpolated. Ultimately, the most useful cartographic data bases may be a file relating each ZIP+4 code to an individual latitude and longitude.

Looking at the rest of this decade, the biggest growth area in computerized mapping will be in the field of in-vehicle navigation systems. The logic of this makes sense: The largest application of conventional maps is normal vehicle navigation.

This year we are seeing the technology of automated vehicle navigation move from the concept-car stage to the appliance stage. A vehicle-location appliance was exhibited at the most recent convention of the American Congress on Surveying and Mapping.

Vehicle navigation systems use satellite, loran, inertial or dead-reckoning sensors coupled to an on-board computer to keep track of a vehicle's location. On a display screen, they show the vehicle's position relative to either a digital map plot or a transparent overlay. In both cases it is possible to show thematic information like landmarks, tourist attractions, motels or restaurants as needed by the driver.

While such systems may seem like a frivolous application of technology, it is sobering to calculate the cost of the 4% proportion of driving that is wasted because of inefficient route finding or because a driver is totally lost.

As these systems become commonplace — as they will be by the end of the decade — we will see digital thematic mapping mature from a tool used only by market researchers and site analysis specialists to a widely used appliance function with benefits ranging from making better decisions to saving time and energy.

Cooke is president of Geographic Data Technology, Inc. in Lyme, N.H., a company specializing in digital map production.

Mapping's past [illegible] portend a healty [illegible]

The first cartographic data base of national importance [illegible] all U.S. counties; it was [illegible] the U.S. Department of [illegible] in the late 1960s and later [illegible] by the Commerce Department's Bureau of the Census. Although recently replaced by a more accurate file from the Census Bureau, it is still the most widely used cartographic data base.

Around 1970 the Census Bureau created Dual Independent Map Encoding (Dime) files for the urban portions of most large cities. The Dime files permit detailed coding of addresses to coordinates and defined boundaries of areas as small as city blocks.

In 1974, the Census Bureau released another cartographic data base, this time defining census tracts (small [illegible] tabulation areas) [illegible]

[illegible]

[illegible] obstacles loom [illegible] to acceptance

[illegible]

ing data for incidence mapping. A dream of mappers is to be able to access a large data base like the Dun & Bradstreet Corp. business file, select a business category and map each selected business with an individual symbol.

However, before this is possible, someone must supplement each business record with an individual coordinate measurement by matching each business address to a cartographic data base like the Census Bureau's Dual Independent [illegible] Encoding (Dime) file. This is a [illegible] task, since present [illegible] ing techniques only match 80% [illegible] 90% of input addresses. The remainder must be processed [illegible] ly.

Because of the size of a [illegible] wide Dime file [illegible]

[illegible]

DIGITAL DISPLAYS THE TERMINALS BEST ENGINEERED FOR BUSINESS.

Before you make any investment in business graphics terminals, it really pays to investigate what you'll be using them for.

If you're like most businesses, your terminals will be used approximately 70% of the time for generating text and numbers. And only around 30% of the time for strictly graphics purposes. The October 1983 *Infosystems* article, "How to Buy Graphics Displays," coauthored by Jim Warner, CEO of Precision Visuals, Inc.,® states, "While it may be true that one picture (chart, graph) is worth a thousand words, there will always be the need for words, thousands of words, in the day-to-day activity of the office. Special graphics-only devices can have limited value in a general office environment."

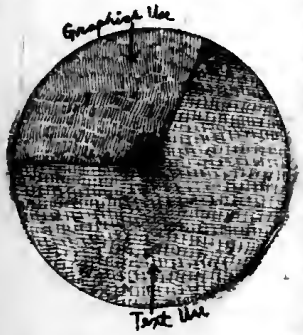
At Digital, the first step in engineering every product we make involves a thorough analysis of who will use it, what it will be used for and which features will help make people more productive in their jobs.

That's been true of every terminal we've designed and helps explain their widespread acceptance and popularity.

And you'll find it's equally true of Digital's latest entries, the VT240™ and VT241™ terminals.

ENGINEERED BEST FOR WHAT YOU NEED MOST.

As the newest members of Digital's family of terminals, the VT240, a conversational

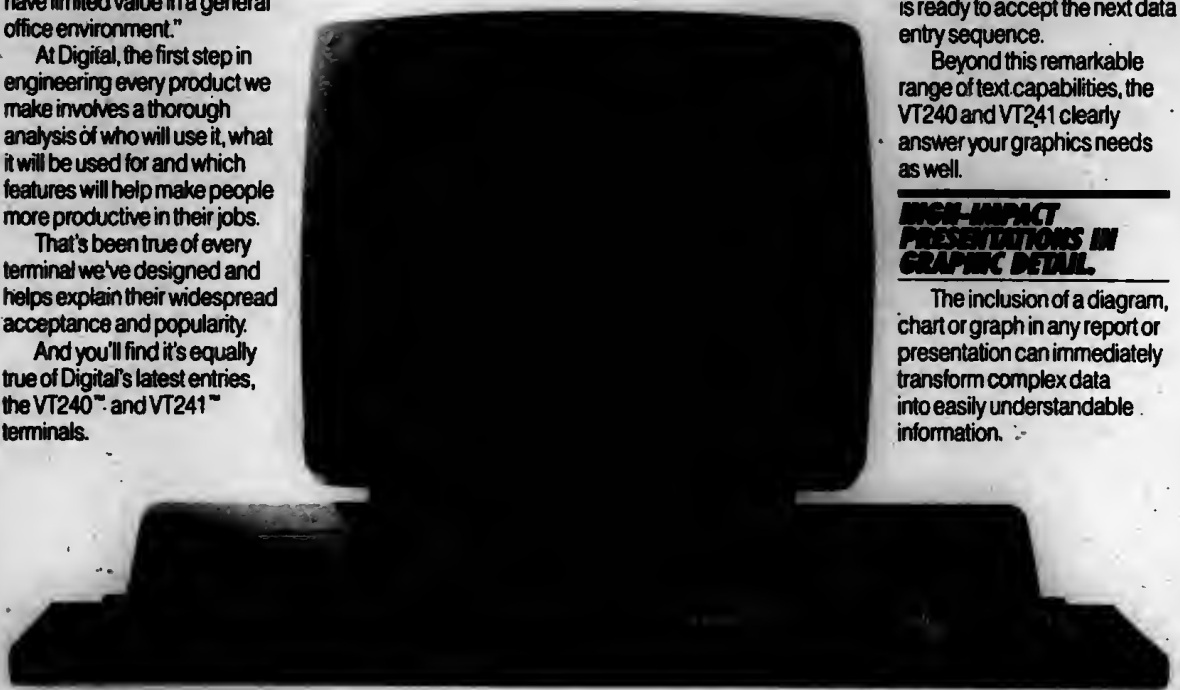


text and graphics terminal, and the VT241, with the added dimension of color, continue the tradition of engineering excellence for performance. They offer full VT100™ compatibility to take advantage of a host of offerings already developed. And to meet the needs of the business environment, you'll find a set of standard text features that are either unavailable on other terminals or may have to be purchased at an additional cost.

These features include bidirectional smooth scrolling, split screen, a choice of 80 or 132 columns per line and a double width/double height format. A highly legible 8 by 10 dot matrix character font displays true ascenders and descenders for exceptional crispness and legibility. If certain information needs to be highlighted, you can select from a combination of bold print, blinking and underlining in either normal or reverse video. For your added convenience, there's even a built-in printer port for printing hard copy.

Both the VT240 and VT241 terminals give you the option of erasing selected character positions on the screen for more efficient communications and increased productivity. For those applications that require data to be entered by filling in the blanks of a form, once the data has been accepted by the host, the filled-in information – and only that – can be erased by means of a single command. The form itself remains up on the screen and is ready to accept the next data entry sequence.

Beyond this remarkable range of text capabilities, the VT240 and VT241 clearly answer your graphics needs as well.



HIGH-IMPACT PRESENTATIONS IN GRAPHIC DETAIL.

The inclusion of a diagram, chart or graph in any report or presentation can immediately transform complex data into easily understandable information.

touchtype, and an editing keyboard and special function keys that reduce the number of keystrokes to complete an operation. Also, the set-up mode offers a menu in plain language (plain English, plain French and plain German) that leads you through each operation in step-by-step sequence.

All this effort has not gone unnoticed. Digital's video terminals received the International Design Award in 1984. The award is based on ergonomic suitability, safety, design quality, practical useability, technical excellence and practical visualization.

BEST ENGINEERED IMAGES ENGINEERED TO A PLAN.

The VT240 and VT241, like every Digital hardware and software product, are engineered to conform to an overall computing strategy. This means our products are engineered to work together easily and expand economically. Only Digital provides you with a single, integrated computing strategy direct from desktop to data center.

Both the VT240 and VT241 terminals generate bit map graphics in a choice of two protocols – Digital's ReGIS™ (Remote Graphics Instruction Set) and Tektronix 4010/4014.™

ReGIS lets you create and store business graphics as simply as producing ASCII text. With VAX-11 DECgraph™ and VAX-11 DECslide™ software, even a novice can prepare graphs and charts and turn them into slides. Self-explanatory icons let you choose a box, circle, line, polygon, triangle or arc.

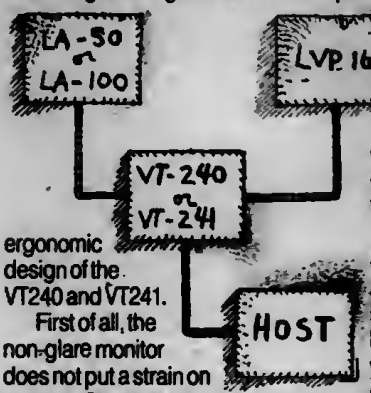
The Tektronix 4010/4014 protocol supports the full array of existing 4010 compatible graphics software. Besides, Tektronix Plot 10,™ TELL-A-GRAF™ and DISSPLA™ from ISSCO® and DI-3000,™ GRAFMAKER™ and GRAFMASTER™ from Precision Visuals are also supported.

When you're using third party software, Digital provides you with the total hardware/software solution: video terminals, hard copy with the LVP16™ Pen Plotter and the VAX™ computer.

THE HIGHEST AWARD FOR ERGONOMIC DESIGN.

Your people have to spend long hours in front of a terminal. It stands to reason the easier they are to use, the more productive the results.

That's why so much time and thought have gone into the ergonomic design of the VT240 and VT241.



First of all, the non-glare monitor does not put a strain on the eyes. Plus, it tilts to adjust to the exact viewing angle that's most comfortable to work with. The detachable keyboard is ruggedly constructed, yet light enough to place on your lap. Even the way the keyboard has been arranged boosts productivity.

There's a standard typewriter keypad so you can

For more information and the name of the Authorized Terminals Distributor or Digital Representative near you, call 1-800-DIGITAL, extension 700. Or write Digital Equipment Corporation, 2 Mount Royal Avenue, UP01-5, Marlboro, MA 01752.

THE BEST ENGINEERED COMPUTERS IN THE WORLD

digital™

SPECIAL **REPORT**

Analysts look at graphics trends, foresee shakeout

By Peter Bartolik
CW Staff

In a television advertisement for a mail service, a young executive resorts to projecting hand shadows on a screen when his presentation materials are not delivered. In the real business world today, the executive is just as likely to turn to some type of computer-generated graphics that is readily at hand.

With a vast assortment of companies marketing a staggering amount of graphics products — ranging from mainframe software to stand-alone systems to plug-in micro software packages — presentation business graphics is increasingly available and ever more easy to use.

According to Deborah Kelly, a researcher with International Data Corp.'s (IDC) Pacific Technology Center, options available to users range from sophisticated software packages designed to manipulate the data bases of mainframes and minicomputers to low-cost microcomputer software packages.

Offerings for micros

At the microcomputer level, she said, the options range from basic software packages to more sophisticated systems specifically designed for business graphics.

Margo Downing-Faircloth, an analyst with Datapro Research Corp. of New Jersey, is currently conducting a survey of end users to determine what they want in the form of graphics. "Users are looking for things that will allow them to put data into graph form, such as pie charts and line graphs," she said, adding that users of microcomputers are choosing packages that cost from $95 to $1,500.

With the proliferation of microcomputers and the spread of computer literacy, some analysts see graphics becoming a commodity rather than a much-desired capability. Creative Strategies International, Inc., in a report published last year called "Emerging Markets for Business Graphics," predicted that business graphics will cease to be a distinguishable market for hardware or software vendors, but rather will be a standard feature of office and business systems. "Business graphics will be one of many capabilities of such systems, not the principal justification for them," the report said.

That trend to incorporate graphics into standard packages is evident in the graphics capabilities of micro software such as Lotus Development Corp.'s 1-2-3 and even more evident recently in the introduction of bundled graphics on Apple Computer, Inc.'s Macintosh.

More options, less cost

According to IDC's Kelly, "The main thing that had been holding back business graphics was the problem of getting color output at a reasonable cost." Recent developments have provided users with a greater range of output device options and a decline in the costs of technology.

Pen plotters with color have decreased in price dramatically in the past two years, Kelly said. Additionally, more products are available that use ink-jet, thermal and even camera technology. Recently, Hewlett-Packard Co. introduced the $3,945 Laserjet printer, which it claimed is comparable to the laser printers introduced for minis four years earlier at costs of more than $100,000.

Vendors offering graphics products now number in the hundreds, and the proliferation has caused speculation that the market cannot support them all. Creative Strategies' report last year flatly predicted a shakeout this year of hardware, software and systems vendors, with leading industry manufacturers increasingly dominating the market.

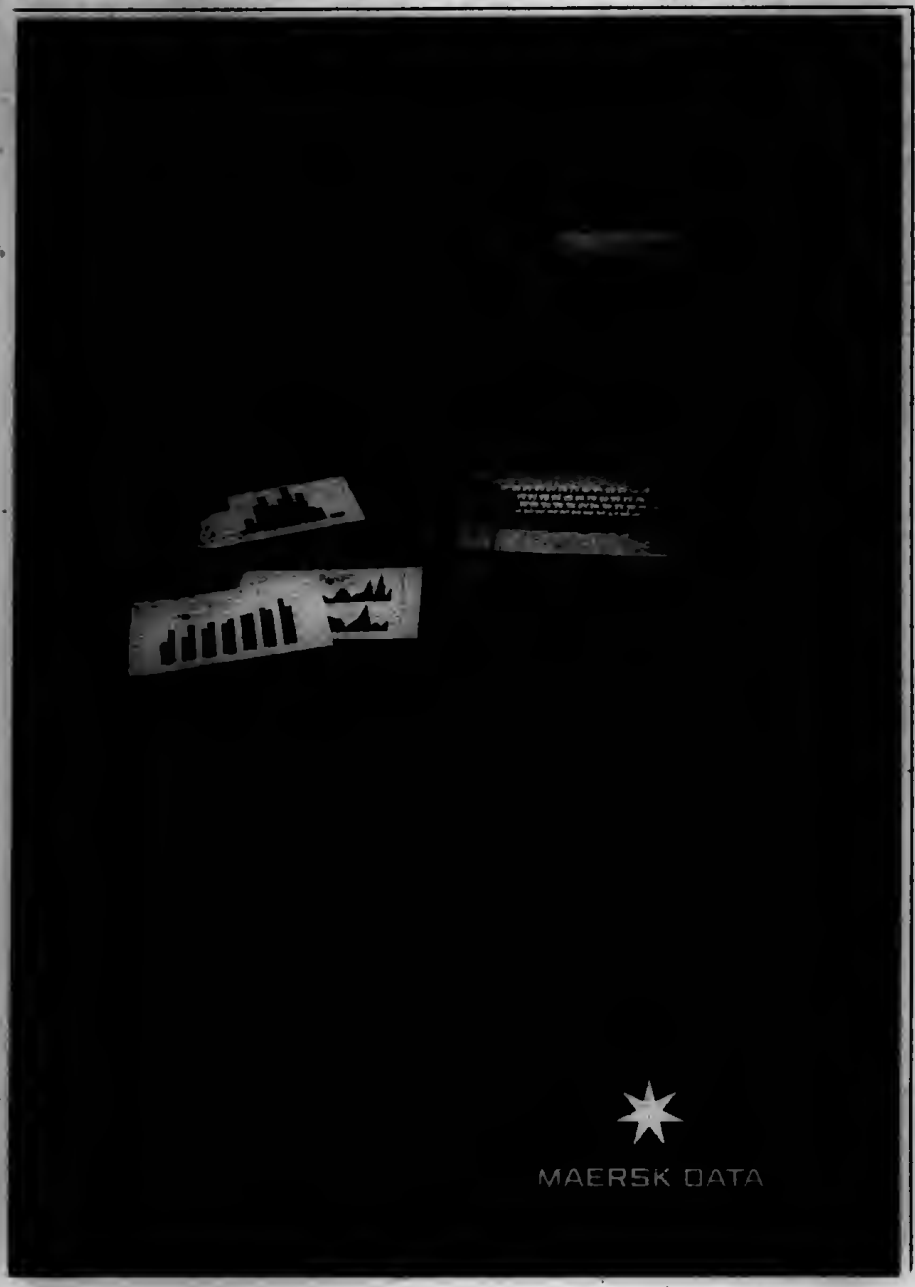
"Financial Strategies in the Computer Graphics Industry," a just-released report from Lindgren Financial Services of Lamoni, Iowa, which examined the financial situations and strategies of 19 publicly held companies deeply involved in the graphics market, contended "that the pressure to grow in this industry will continue to force firms in the industry to put increasing amounts of money toward decreasing growth rates for the foreseeable future."

Squeeze is middle tier only

But that type of financial squeeze seems mainly to affect the middle tier of graphics products vendors, those mainly involved in developing graphics-specific, stand-alone systems.

Developers of software for large systems seem to be enjoying a boom. Integrated Software Systems Corp. of San Diego reported for fiscal year 1983 a 45% increase in revenues and a 72% increase in profits over the previous year.

According to Datapro's Downing-Faircloth, there is much talk among end users about the desirability of being able to tap into corporate data bases and manipulate the data for graphics applications. For those who do not want to invest in high-priced output devices for high-caliber graphics, IDC's Kelly noted, there are networks on which data can be transmitted to a publishing center for output on high-quality devices at rapid rates.



SPECIAL REPORT

A guide to presentation-perfect graphics

By Lois Carducci
Special to CW‡

All of us have been to presentations where slides and graphics are used to show off the presenters' products and ideas. The means of delivery may be good, but how many of these conferences have you gone to and thought to yourself, "What are they trying to say?"

After all, the reasons we use graphics are to make our data clear, easy to read and understand. We want to hold and attract the attention of our audience, transform our data into information that people can use. If you use some common sense and the following tips, good graphics can be the positive results.

- Make the axis labels and numbers large enough to be read easily. This is especially true if you have a large audience.
- Use scales that will make interpolations easy. For example, number the axes in increments of fives, 10s or 100s, not sevens or 18s.
- If you are using multiple charts, use the same scaling to make comparisons easy.
- Unless you want to emphasize a data value, keep the annotation outside the chart.
- If you are using a grid in your chart, watch the line weights. You do not want to make the grids more powerful than the actual data lines.
- When possible, include a zero value for reference.
- Try not to overnotate. The purpose of graphics is to get the information across in pictorial form.
- When using logarithmic scaling, make sure your audience is knowledgeable about interpreting log scales.
- When using bar charts, if possible, sort the bars by magnitude.
- Try not to use too many different shading patterns in bar charts; it could cause an optical illusion.
- Label all data sets.

Using color

When creating graphics, color is a big plus in highlighting critical data, enhancing visual contrast and conveying information quickly and efficiently. Studies have shown that executives prefer it.

There are also some important considerations to make when using color in your graphics:

- Select color combinations that are compatible. For example, avoid a yellow background with white lettering; it just cannot be seen.
- Use consistent color coding on all charts — that is, all labels in black, all titles in blue.
- Use colors and shapes that reflect their denotations. Use a red octagon for a stop sign, not a blue triangle.
- Use high-contrast colors for character/background combinations. On a white background, use black or blue lettering.

By following these simple guidelines, your graphics should come out presentation-perfect.

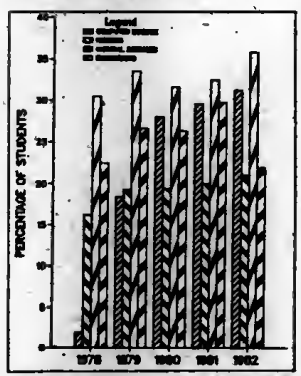
Graphics can lie

Also, be aware that you can use these guidelines to lie with your graphics.

Data can be hidden or slanted in your favor by using the guidelines in the opposite manner than was recommended.

For example, by making the axis annotation very small and the data a yellow bar on a white background, the person viewing the slide will be unable to make it out, particularly if he is sitting away from the screen.

Carducci is a senior computer systems training analyst at the management information center of Johnson & Johnson in Raritan, N.J.



Avoid using screens and patterns that confuse the eye.

STANDARD from SR/2

GKS make this possible.

Another aspect of portability is device independence. This allows an application to use any of the supported display devices with the same high-level calls. Device independence is made possible by having the modular architecture hide the individual characteristics of the display devices from the application.

For software developers, the benefit of device independence is the ease with which new devices can be supported by the application. For end users, this means greater flexibility in choosing the display devices that can be used with the application.

The final aspect of portability is programmer portability. If the methodology used in creating graphics images is standardised, the portability of programmers from project to project is increased, and the cost of training is reduced.

The VDI defines the interaction between utility layers, like Core and GKS, and the various device drivers used to control output devices, like video bit maps and pen plotters.

The term VDI refers to the use of consistent, device-independent commands that control an idealised virtual device.

These commands are generated by the utility layer. Each physical device is supported by a device driver, which interprets the device-independent commands and maps them into the appropriate device-specific instructions required to generate pictures from the physical device.

VDIs can be used as building blocks to develop additional utility layers. For example, an OEM or in-house development team may want to produce a set of custom routines that are optimised for a particular application. As long as these routines generate VDI commands as output, they can use all the device drivers that already exist for the Core or GKS system.

Another use of VDIs is in storing graphics images. These can be stored on disks as sequences of VDI commands, and a playback utility layer can then read the files and regenerate the images. VDI commands can be integrated with standard Ascii text to produce mixed graphics and text documents.

Users can also use their microcomputers as intelligent graphics terminals connected to remote hosts. The problem is that various graphics protocols have arisen over the years to handle the transmission of graphics over communications lines.

MIS directors are faced with the problem of having to support all these protocols without wanting to place multiple dedicated terminals on their users' desks.

The solution is to use the microcomputer as a universal workstation — with software utility layers that allow it to emulate the various protocols.

The benefit of the VDI approach is that it provides an extensible graphics system. The system can be extended to include additional utility layers like Core or GKS or additional graphics terminal emulators like NAPLPS. It can also be extended to support new output devices like laser printers.

The VDI standard is currently being reviewed by the American National Standards Institute, and final approval is expected to occur late in 1985. In the meantime, various companies have implemented their own VDIs. While these differ from each other and will probably differ from the final standard, they serve the purpose of allowing vendors to implement extensible systems.

Until national standards are approved, the user should ask his vendor whether the vendor has implemented a system with a modular graphics architecture that incorporates the VDI approach. This ensures that the system can be extended to support the Ansi-standard VDI once it has been approved.

It is not clear which VDI will finally emerge as the official standard. But with VDI-based architectures, users and vendors gain adaptability and flexibility and an assurance that they can invest in graphics equipment without fear of obsolescence.

NBC from SR/2

within about 14 spaces of each other should be within the same text block. Two characters at diagonal corners of a single imaginary 3- by 3-character text block would result in a smaller byte count than if the two characters were in their own text blocks and similarly positioned. But a like arrangement of two characters in an imaginary 4- by 4-character block is best done as two separate one-character text blocks.

The NAPLPS standard includes the provision for incremental coding of points, lines and polygons as an alternative to the normal coding of graphics objects. The AT&T frame-creation terminal contains a soft switch that can be used to code completed designs using the incremental process. In complex designs, this can save hundreds of bytes. It is used at NBC Teletext as a matter of course. To some extent, continuing development of the entire teletext environment will increase the total number of bytes that can reasonably be used in a single page. New additions to the page management system at NBC Teletext will permit pages of up to 6,000 bytes.But until more scan lines can be used within the television signal, and until the decoders at television sets become more capable, realistic limits of about 2,000 bytes per page will be the rule. To be successful, artists and writers working on these systems will still have to become adept at balancing byte counts.

SPECIAL REPORT

Geographic data base, map display assist public utility

System devised to help water department maintenance crews locate clogged drains

PHILADELPHIA — In the older U.S. cities, the managers charged with keeping the physical infrastructure functioning are finding themselves being squeezed. On one side, real budgets for maintenance are shrinking, while on the other side, citizen needs for services remain at an all-time high.

In the Philadelphia Water Department (PWD), this dilemma is being met by using computer graphics to give operating personnel a head start on providing services and a tool to stop some problems before they start.

The PWD receives thousands of complaints each month about clogged storm-water inlets. The Inlet Cleaning Section of the PWD is charged with responding to these complaints, as well as with taking care of the scheduled cleaning and operation of the approximately 75,000 inlets in the city.

On any given work day, almost 50 crews are on the street solely for the purpose of keeping these inlets clear. Over the course of a typical year, the crews remove about 1.5 million cubic feet of debris. This requires a substantial investment in personnel and heavy equipment. Moreover, 75,000 inlets can cause a considerable liability exposure for property damage and personal injury.

Limited opportunities

Because the number of complaints received is so large, the inlet cleaning crews have only limited opportunities to perform any regular, not to mention preventive, maintenance functions. PWD management realized that in order to make the inlet cleaning program more effective, it had to begin by making complaint handling more effective.

Before the computer-aided dispatching system was implemented, crews would be sent to an area in response to a complaint of flooding with only a general description of the specific location and would be instructed to clean debris from all nearby inlets. Generally, storm-induced flooding would have subsided by the time a crew reached the complaint location. As a result, much time was lost as crews positioned their equipment and excavated minor amounts of leaves and trash from inlets that had already drained quite adequately.

The department and its consultants devised a software package and a data base structure that uses computer graphics displays to get the crews to the right inlets, thereby minimizing unnecessary travel and setup. The software was developed by O'Day, Caruso & Prichard under subcontract to Temple University. It is written in Fortran and operates on a Hewlett-Packard Co. HP 3000, which the PWD maintains. The data bases are constructed using the HP Image data base utility, and the graphics are displayed on HP 2623A graphics display terminals.

Handling complaints

The system aids in handling the complaint from the minute a PWD telephone operator picks up the telephone, through to the foreman's scheduling of the work and dispatching of crews, up to the logging of work completed and the accumulation of a history of actions taken.

The Philadelphia Water Department's system provides graphics mapping of the entire city. Screen images of intersections provide information such as street names, the odd and even sides of the streets, the numbers of the houses on each block and the location of each storm drain.

When an operator receives a complaint, the location is keyed directly into a screen form, either by the house number or by the pair of street names of the nearest intersection. The software displays the street layout at that location and shows the positions of all known storm-water inlets.

Using graphics to locate the desired facility is quicker and more reliable than using verbal descriptions, since the same physical location can be described in many different ways. Moreover, many city inhabitants have only a limited idea of how their block fits into the surrounding geography. An instant map display allows the telephone operator to ask the questions necessary to fix the exact location of the problem.

According to Nancy Brayski, the PWD staffer responsible for logging complaints and updating the files, "Usually the caller knows pretty well what he's talking about, but pretty often you have to ask some questions to narrow down the problem to the right inlet. If you can't do that with the person on the phone, there's just no way that a crew is going to be able to find it [by] driving around. The map is a big help in asking the right questions."

Details about the problem can be entered, and the complaint is logged into the system. The system tells the operator if there is already a complaint logged against that inlet, thus preventing any duplication.

Saves effort, paperwork

This feature in itself saves a considerable amount of effort and paperwork. The system enables a foreman to assign work to crews, print work tickets and log work completed into a history maintained for each inlet.

According to Robert F. Serpente, chief water transport operations engineer for the PWD, "When you figure how much we spend in total on cleaning inlets and divide it by the number of inlets we clean, you get an answer of about $48 to clean just one inlet. A lot of that is [spent] just in processing the complaint and getting the crew and equipment to the right place and doesn't vary — no matter whether the inlet really needed attention or not. What we have done here is to get the men and equipment to the jobs that really need doing."

The screen graphics display is made possible by a data base that was constructed specifically for this purpose. It has two sections: the geography (such as street names, house number ranges and intersection information) and the facilities detail (the master record for each inlet itself). Each inlet is associated with both a street location and a street intersection, allowing the software to retrieve all inlets associated with any location.

The geographic data base was constructed by modifying and restructuring the street and address information available from the Geographic Base File/Dual Independent Map Encoding (GBF/Dime) file produced by the U.S. Bureau of the Census. These files are available for the urban areas of every major city in the U.S. and contain one record for every segment of every street.

The file for Philadelphia was processed and restructured into a more usable form, allowing retrievals by street name and address as well as by street intersections. It was also enhanced with coordinates for curbline locations to allow a more accurate graphical presentation of the data.

The inlet facilities data base was coded from paper records that the department had collected. The coding was simplified by using the geographic data base to produce the coding forms already filled in with street name and house number information. In this way, the information being coded was automatically associated with the proper street location and intersection.

Production use of the Inlet Cleaning Operations and Information System began with one pilot area in July 1983. Inlet cleaning personnel use it to log and track over 100 complaints a day and now have information concerning the location and history of each facility.

According to William Price, a PWD district foreman, "[It took] quite a bit of getting used to at first, because none of us had ever worked with a computer before. It took a little while to get the hang of scheduling work on a screen instead of shuffling a stack of paper tickets. But once I got used to it, it made it easier to keep track of where the men are, since the computer makes me up a list each morning.

"Used to be, I'd have to write that all up by hand — every detail about every complaint. [Now] it's easier at the end of the day [to check] what they have done. I can just go write the list in the computer and check off everything that was done."

Brayski said, "The computer has brought more of the decision making into the office. We didn't used to have any way of telling whether a complaint was accurate or not. We just gave it to the foreman and let him worry about whether it was work that needed doing or whether the location even made sense. I've now got the information on the computer that lets me screen the complaints as they come in.

"While this has certainly not simplified things in the office, we do know more about what is going on, and it is good to be able to tell a caller that their complaint has been logged, or that a crew took care of it already without having to take time to go to the files.

"We're definitely getting the complaints out faster. Complaints now are always ready for the foreman to schedule the same day. It used to take at least two days, sometimes three, before the paperwork was in the formen's hands," she said.

Other projects started

The success of using graphics displays and a geographic data base led the department to initiate other projects. A similar effort is now nearly complete to automate the work order processing of the crews who provide the repairs to the storm-water inlets: masonry, excavation and so forth. While the graphics functions are similar to the inlet cleaning system, this system ties the geographical location of the facility to many more types of possible activities, as well as accounts for the materials used in the repairs.

An even more ambitious and comprehensive project is now in the final design stage. This system will automate the dispatching and record keeping for the crews who perform repairs on the sewer pipes buried in the streets. Its graphics display will show the locations and characteristics of the pipes in a street and will assist in dispatching the proper crews with the right equipment and materials in a timely fashion.

As the benefits of spatially oriented data bases of facilities associated with geography have started to be realized, other divisions have also initiated programs to track activities for such facilities as water mains and fire hydrants.

SPECIAL **REPORT**

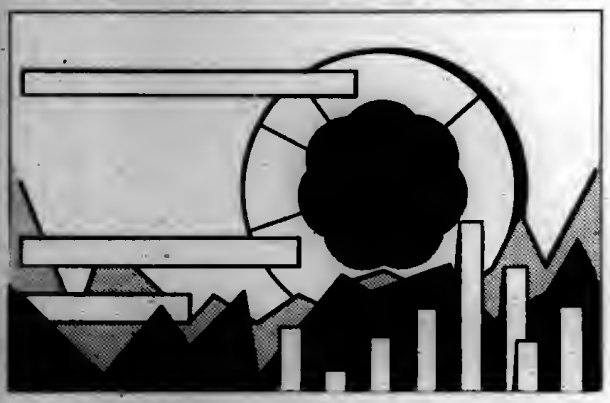
Automated slide system helps bank project proper image

BOSTON — When you are the largest bank in New England and one of the top 20 in the U.S., with over $18 billion in assets, how you present yourself graphically — to the business community at large and to your own staff — becomes of paramount importance.

The Bank of Boston met this challenge in part via a computerized slide system. The system satisfied the bank's need for highly individualized presentation slides — that were as professional-looking as they were economical — and slides that reflected in quality and aesthetics the bank's status as one of the nation's leading financial institutions.

The bank decided on a system called the Magi Major Leaguer, originated and manufactured by Mathematical Applications Group, Inc., of Elmsford, N.Y.

"We turned to the Major Leaguer because we wanted more control over creativity, production and costs," said Kathy Whittemore, who is a public relations officer in the bank's Corporate Communications Department. "The system gave us the versatility and speed to produce custom-designed slides at a price we couldn't duplicate using traditional outside sources," she added. The system enables bank users to design slides at a computer terminal, to display the images on a CRT terminal, to send slide data via modem to a regional production center and to receive finished color slides back in 24 hours.



Before the Major Leaguer was installed late in 1982, the bank had been a modest user of presentation slides, most of them prepared by design studios. Whittemore said the bank today produces 100 to 200 computer-generated slides a month.

Senior management, she said, often use the slides to highlight business analyses for internal needs, while other slides may be used to interpret statistics for external presentations.

Slides are also produced for the bank's annual meeting, as well as for marketing meetings held for marketing officers.

"We have actually produced slides for reproduction in our annual report and then displayed those slides at stockholder meetings," Whittemore said. "The Major Leaguer system has provided continuity of design and visual impact — which is an important component in our overall communications program."

With a background in public relations, advertising and art history, Whittemore has turned the slide system, she said, into very much "a tool of the imagination" that has taken the system beyond its standardized formats.

"It's not uncommon for us to use the system to create images of our bank building, maps of the U.S., logos and other symbols that we integrate, in turn, into the slides," she said. The elements are stored in the system's electronic library and can be recalled, changed in size and color and repositioned as needed.

Freedom to make custom designs

"The nice thing about the system," she said, "is that you can throw in as many special effects and symbols as you want for essentially the same price as the standard formats. It gives us the freedom to create custom designs that have an identity all their own.

For technical advice on carrying out some of her design ideas, Whittemore calls the Major Leaguer Hot Line, a support service based at the same regional production center at Mathematical Applications' corporate headquarters in Elmsford, N.Y., that processes her slides.

The hot line is an important aid, she said, especially in tight-deadline situations.

"People at the bank like the quality and strength the Major Leaguer brings to their presentations," she declared. "It has markedly increased our use of slides, and I expect we'll expand our use in the future."

SPECIAL REPORT

Computer-crafted slides prep photo firm's salesmen

PARAMUS, N.J. — It seems only natural that a photographic products manufacturer would use slides to provide technical product knowledge, sales skills training and marketing information to its sales representatives.

Ilford, Inc., based here, uses slide shows, and it creates sales aids and marketing materials, such as overhead transparencies, brochure illustrations and sales organizers, by enlarging and duplicating the color slides.

"Photographic slides are the logical choice for a photographic company to launch new products, train newly hired sales representatives and make presentations at national and regional sales meetings," said R. Charlene Castello, Ilford's training manager.

Castello's slides are generated on computer graphics systems at Genigraphics Corp.'s New Jersey service center in Florham Park, N.J. Genigraphics, a manufacturer of computer-slide-generating equipment, operates a nationwide network of 23 service centers that provide design, consulting and production services.

According to Castello, Ilford does not have the volume to warrant the installation of an on-site computer graphics system. Since 1980, an estimated 20 slide programs and a total of 1,000 slides have been produced. The largest production — the introduction of Ilford's Ilfospeed Multigrade II black-and-white printmaking system — required 200 slides.

"Computer-generated slides show our products to their best advantage," Castello said. "The slides enable us to communicate complex, technical information in a simple, straightforward manner and in an interesting manner; something that captures people's attention; something that leaves a very permanent, visual, memorable image in their minds, so that whenever they think of self-masking or developer-incorporated paper, they'll always think of our message."

Ilford, established in 1956 and based in Paramus, N.J., is the U.S. marketing operation of the Ilford Group, a worldwide producer of photographic products and a division of Cibe-Geigy, which is a $6 billion Swiss chemical and pharmaceutical company.

Training programs introduced

According to Castello, formal training programs were first introduced at Ilford in 1980 to support expanding product lines and a changing photographic market. "Ilford has moved from being a supplier of film, paper and chemicals to a systems approach where we provide a total package to a customer, from sensitized products and chemicals to enlarging and processing devices."

Ilford's sales force is structured to meet the needs of the various segments of the photographic market. Manufacturers' representatives sell the company's products to retail camera stores for sale to photo hobbyists. District supervisors sell to dealers who address the needs of corporate in-plant photographic facilities. Technical sales representatives sell in the traditional and professional markets of custom labs and photo finishers.

Within the past three years, Ilford expanded its sales force by creating a new sales group: equipment applications specialists. These specialists sell the company's new lines of equipment, including the Cibachrome Copy System and the Cibachrome Print Center, to in-plant labs and retail photographic copy services.

As the sales force evolved to meet the demands of an increasingly competitive and complex market, Ilford's training programs similarly evolved.

"We now have to provide comprehensive, technical product knowledge — what the product is, what the product does, how it works," Castello said. "But it's not enough now to be able to talk about the technical features, such as the contrast range of a paper.

"Now, we have to develop the benefits for the customer. So we have to provide sales skills training: selling those strategies for a product that address what the product can do for a customer technically and financially, in terms of the return on investment, the economics, the cost savings, how the product will cut down on reprints and paper waste — aspects that give the customer a competitive edge."

In addition, Castello said, when launching new products or training members of the sales force, "we also ensure that any product information and training is consistent with the company's market strategies for that product."

Range of colors, symbols

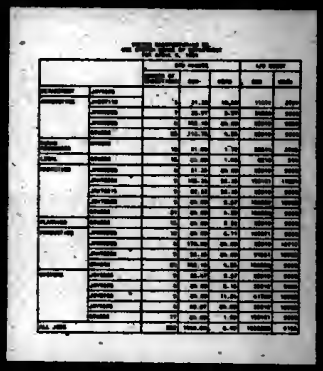
With the Genigraphics systems, Castello said, she is able to use a range of colors and symbols. Genigraphics' systems currently feature a selection of 16 million colors. A database stores more than 2,000 standard illustrations and symbols, ranging from photographic to data processing artwork, as well as special effects, such as multiple-drop shadows.

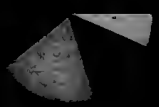
Using the system, Castello said, she is able to create "anything Ilford needs, no matter how technical. We have created cross-sections of papers and films, displays of what happens during a specific copying or developing process, pictures of enlargers and other equipment."

Castello noted that in many instances, the Genigraphics slide is not the final product that Ilford uses. Using its Cibachrome copy system, Ilford produces color overhead transparencies and color prints from the slides.

The SAS System. . . .

The Solution for Your Information Center





☐ I want to learn more. Send me The SAS Solution packet.
☐ Have a sales representative call me today!

Please complete this coupon or attach your business card.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ ZIP _____

Phone (_____) _____

Hardware _____

Operating System _____

SAS Institute Inc.
SAS Circle, Box 8000, Cary, NC 27511-8000

SAS.

SPECIAL **REPORT**

Flexibility, economy move mouse ahead of the pack

By Albert L. Whetstone
Special to CW‡

For those who have never tried, a word of caution: Drawing pictures with a keyboard is very difficult.

Some seers are saying that by 1990 one in every two or three office workers will have his own computer. The trend toward this has brought about, and will continue to be the driving force behind, a dramatic change in the approach to the design of computer software applications. It will also be the major force behind a more dramatic change in the design of interfaces between software packages and the people who use them.

The argument that the alphanumeric keyboard is the most heavily used device and, therefore, any other device (joystick, mouse, touch pad or what have you) is supplementary is a flawed argument. We already have applications and programs in which the "supplementary" device is the dominant tool.

Three types of mechanisms

The mouse and the touch pad enable us to use gesturing and interactive mechanisms that have been classified as three types:

The first type has been called a "pick" or "select" mechanism. It enables us to select something. That something may be a piece of data, an area of the screen, a token or an icon, or it may be a function designator.

The second type is used to "place" or "locate." That is, one can locate a region and use that located region either to place something or to concentrate further the user's and the computing mechanism's attention on it for subsequent activity.

The third mechanism has been called a "value" or an "evaluate" tool. Value is the determination of XY coordinates on the display screen or on the corresponding logical plane to which the picked or placed information is to be associated.

Several years ago, a systematic evaluation of the various auxiliary devices indicated that the mouse could outperform all others for the three operations listed. It is fast, accurate and natural to use. It provides feedback that is superior to that of a joystick or a trackball, and it offers a means of gesturing that is less tiring, faster and more accurate than the touch screen or light pen.

The first generation of mouses, introduced as long ago as the late 1960s, was mechanical. The earliest mechanical mouses had two wheels that were mounted at right angles and rolled along a desk surface. Each wheel turned a potentiometer. In the 1960s there were no analog-to-digital converters on a chip costing a few dollars, so the interfacing was expensive.

The next mechanical approach was to sense the mouse movement by use of a ball that rolled over a table surface. As the ball moved, it rotated rollers inside, which turned shafts. The shafts, in turn, were attached to optical or mechanical encoders.

The output from mouses using encoders is typically in quadrature. Since no computer uses a quadrature input, some sort of interface for conversion is required. The resolution of this mouse is 200 count/in., which is relatively good, compared with the next type of mouse.

The optical mouse is a fairly new device. This mouse is restricted to traveling around on a pad because it uses an LED to track its position. It decodes reflected light from the pad, which contains colored lines. The reflected light is received by a four-quadrant photodetector and is then processed by the mouse's microprocessor to determine distance and direction of movement. The mouse pad consists of a highly reflective material printed with grid lines of nonreflecting ink.

A third type, the acoustical mouse, has recently been introduced. To understand its method of operation, consider rubbing a paper clip or a pen or any other object across your desk. It will make a sound, the amplitude of which is dependent upon velocity and the duration of which is dependent upon the distance of travel. Inside the object that you rubbed on your desk there are, of course, minute strains, and these can be measured to determine direction. With the acoustical mouse, you are measuring vector distance and angle, which are then converted to XY coordinates. The microprocessor that does the conversion also calibrates the scale factor. This mouse, like the optical mouse, is all solid-state.

The acoustical mouse is relatively independent of the surface on which it runs. The sound pickup consists of a suede pad on the bottom and a piezoelectric transducer, so that the acoustic pickup from the surface depends more on the suede material than on the texture of the surface.

The advantages and disadvantages of the above technologies may be cocktail party talk for some time, and, in fact, each method may have advantages that are specific to a given application.

Whetstone is chairman of Display Interface Corp., a Milford, Conn.-based manufacturer of computer peripherals.

SPECIAL REPORT

Mechanical, optical and acoustical mouses: a comparison

Below is a comparison of some of the characteristics of the mechanical, optical and acoustical mouses discussed on the facing page.

■ **Noise.** Mechanical mouses, by virtue of being mechanical and having a large, heavy ball in their bases, produce noise when they are rolling along a surface, unless they are given a special surface such as a sponge pad, but this is a restricting disadvantage. Optical and acoustical mouses both have a felt or suede belly and produce imperceptible noise.

■ **Dirt.** Mechanical mouses, having a ball that rotates on the surface, tend to pick up dirt, fragments from erasers and grit. The pad on which optical mouses work can be cleaned with ordinary window cleaner, but it is susceptible to scratching. Although acoustical mouses have only recently been introduced, they do not seem to be sensitive to dirt.

■ **Special pad.** Mechanical mouses can work without a special pad, although on smooth surfaces such as desk tops and Formica they tend to slip, and therefore closure is not achieved (that is, a circle does not end where it started). Optical mouses need a special surface with inked lines. Acoustical mouses will run on virtually any surface, whether it is a wooden or Formica desk or someone's lap.

■ **Intelligence.** Most mechanical mouses have no built-in intelligence. They pass out quadrature signals from an encoder and require intelligence in an interface. Optical and acoustical mouses require microprocessors for their operation, and therefore the same microprocessor is used to program the protocol and the format. They can output real numbers that require no further burden of boxes or interface boards. Optical and acoustical mouses usually use an RS-232 interface. They can be programmed to run their own diagnostics or respond to commands from a computer.

■ **Costs.** Although mechanical mouses do not have built-in intelligence, it seems that those capable of good resolution and linearity, just by virtue of being mechanical, have no cost advantage over optical or acoustical mouses.

■ **Resolution.** The optical mouses that are currently being produced have a resolution of 100 count/in. One of the forefronts of information display technology is high resolution, and it will probably not be long before mouse resolution finer than 100 count/in. is required. Some mechanical mouses do provide 200 count/in. Only the acoustical mouse is capable of going to extremely high resolution — 1,000 count/in. or more — and the required resolution is programmable. It is also not easy to select a single pixel from the display screen with the optical mouse technology. With the acoustical mouse, it is possible, although on high-resolution screens very careful operator attention is required.

■ **Durability.** It seems that all three mouse technologies offer durability of several hundred miles of operation, although the caveat of susceptibility to dirt does apply.

■ **Touch pad.** For the touch typist, it is frequently not desirable to go off a board to grasp a device such as a light pen, a digitizer stylus or a mouse. Acoustical mouse technology has been converted into a touch pad that is included on a keyboard and can readily be stroked without the necessity of leaving the keyboard. The touch pad's resolution and repeatability are the same as the mouse's. The conversion is easy: The mouse is turned upside down so that the sensitive surface is level with the keyboard, and the sensitive surface is made the proper area for the touch pad. This conversion is not possible with mechanical or optical mouse technologies.

Mouse emerging from its hole

After the mouse was introduced in the 1960s, it languished for about a decade. Four elements had to be present simultaneously for the mouse to become a ubiquitous tool for interaction.

First, it had to achieve some recognition. This it has certainly done, with feature articles in *Time*, *Business Week*, the *New York Times*, the *Wall Street Journal*, *Fortune* and many trade journals and newspapers.

Second, with the introduction of small, special-purpose computers and workstations, the cost and performance advantages had to be achieved. The mouse is certainly more economical to produce than most other auxiliary devices, and it has proven to have performance advantages.

The third element was vendor support, which we have seen from leading suppliers of small computers.

The fourth element that had to be in place was third-party software and application support, and this is being provided by large, established software houses and hundreds of bright, young entrepreneurs.

SPECIAL **REPORT**

Study: Decisions based on graphics may be faulty

MINNEAPOLIS — Is a picture worth a thousand words? Is one worth a hundred numbers?

Probably not, according to research results from studies that were conducted at the University of Minnesota here on the use of business graphics.

Minnesota researchers have discovered that managers using graphics rather than tabular data perform poorly on many decision-related tasks.

Furthermore, they have evidence to suggest that what is done with the graphics makes a difference on how effective they are. Results show that graphics are very good for trend spotting, but not that good, apparently, for interpreting data, such as on financial reports.

Some other findings

Some of the other things that came out of the managerial graphics projects conducted by the Minnesota researchers are:

- People, when confronted with a set of data that should be graphed in order to use it effectively, do not take a graphics approach.

In fact, without a nudge toward graphics, only about 3.5% of people will graph when they ought to.

- Use of graphs does not help people find business problems.
- Use of graphics does help people forecast accurately. Furthermore, forecasts based on graphs have significantly less variability among forecasters than when tabular data is used.
- There will be a moderate, but not explosive use of managerial graphics by business in the next few years.

graphics are using them for communications purposes, the major use will move to decision support in a few years.

- A major limitation of current business graphics systems is their inability to link into centralized organizational data.
- How graphs are drawn, their quality, scaling and accuracy makes a difference on their effectiveness in supporting analysis and decision making.

The Managerial Graphics Project is a major activity of the Management Information Systems Research Center within the graduate School of Management at the University of Minnesota.

The project involves survey, field and experimental research. In the past year, four graphics experiments were conducted involving hundreds of manager and student subjects.

Mail survey conducted

Another major activity was a mail survey conducted in association with the Society for Information Management and the Center for the Study of Data Processing at Washington University in St. Louis.

The results of the survey, to which over 200 firms responded, is the best current picture of how organizations are currently using business graphics and how they intend to use them in the future.

One hundred and sixty-three of those responding to the survey had experience with business graphics; one organization had utilized the tool for 25 years. The major users of graphics are the functional areas of finance and marketing and the information systems organization itself.

Users 'somewhat' satisfied

These users, in general, are only "somewhat" satisfied with currently available graphics hardware and software. Only about 12% of the organizations responding have formal plans for computer graphics.

The Minnesota researchers intend to follow the initial mail survey with in-depth interviews with large and innovative users of business graphics.

In addition to an ongoing experimental research program, the project is planning to host a conference on the topic of managerial graphics to be held in the spring of 1985 in Minneapolis.

In addition to studying the current and expected use of business graphics, the Minnesota project will address further questions, such as:

- What activities do managers and professionals have in their jobs for which graphics will be useful, and what properties of graphs are most effective for each activity?
- How does the use of graphs for communication and persuasion differ from the use of graphs for analysis and decision support?
- Can we develop any graphics standards regarding properties such as use of colors and bars vs. pies vs. lines, scaling, default options and nontraditional graphics — icons and Chernoff faces, for instance.
- How can large-screen graphics be best used in group settings?

It is expected that the Managerial Graphics Project will be an ongoing activity that will last for several years.

More information about the project can be obtained from Prof. Gary W. Dickson, Minnesota Managerial Graphics Project, MIS Research Center, School of Management, University of Minnesota, Minneapolis, Minn. 55455.

Navy enlists war game simulator in training effort

Battle situations created by computer allow tactical analysis at little expense

SAN DIEGO — This isn't exactly a video arcade the U.S. Navy is running here, but naval officers are playing these computer games as if it were a matter of life and death. For quite some time, computers have been playing an increasingly important role in the military. Battle simulation is one area in which they are particularly useful, allowing analysis of the cause and effect of every action within an entire theater of operations. Perhaps of greater importance, simulations are far less expensive to stage than the real thing.

"The U.S. Navy can no longer afford to fund the kind of large-scale exercises necessary to train senior officers in battle group tactical situations," explained Lt. JoNell Miettinen, deputy program manager for the Naval Warfare Interactive Simulation System Development Program.

"There are also capabilities problems in the physical exercise," she continued. "For example, our P-3 patrol aircraft just cannot realistically duplicate a Soviet Bear aircraft. With computer simulation, however, we are able to achieve a significant amount of realism, often to the point that war game participants forget that it is a game and actually begin reacting as if it is a hot war."

'Ultimate computer game'

"The ultimate computer game" is how senior Navy officers described the Interim Battle Group Tactical Trainer (IBGTT), one of the latest of these military war game simulators that use computer graphics displays to update players on the tactical situation. Brought on-line in January 1983, the IBGTT represents over 18 months of research and development by civilian and naval engineers and programmers from the Naval Ocean Systems Center (Nosc) here.

The Nosc facility is one of the Navy's laboratories for R&D in weapons and command, control and communications. To support tactical training for the fleet battle group staff, IBGTT software was developed to provide realistic battle experience — battles complete with weather hazards, submarines, aircraft, conventional and ballistic missiles, false sonar targets and electronic countermeasures.

The IBGTT software provides participants with a three-sided interactive scenario in which opposing sides are able to define, structure and dynamically control their forces.

Each side is provided with its own view of the world, a view that includes a data base describing the current tactical situation. Each side's view of its own forces is current and complete. Its knowledge of the other forces involved, however, is based on data provided by its sensors, such as radar, and on communication with other sources.

The war game software package consists of eight programs, three of which are concerned with system communications. The remaining five — Build, Force, Wargame, Wargame Control and Post Game Analysis — handle the game itself.

- Build enables participants to create, change, add or delete platform, sensor and weapons characteristics by entering orders through a command-center terminal.
- Force enables participants to create, change, add or delete elements, element dispositions, environments, operating policies, procedures and capabilities of a scenario by entering orders through a command-center terminal.
- Wargame executes the war game scenario, which was created by the Force program and populated by the Build program, by implementing software models and algorithms in accordance with student, instructor and operator inputs.
- Wargame Control coordinates and controls all the processes executed concurrently on the system during a game.
- Post Game Analysis processes data collected during a game to measure the effectiveness of the tactics displayed during the game.

The simulation programs were developed on Whizzard 7200 graphics systems from Megatek Corp. The systems are used in the simulators with Megatek's Wand software-support package.

Officers at the Naval Ocean Systems Center in San Diego use both a conventional plotting table and a joystick-controlled Whizzard 7200 system as their command center for a battle simulation game.

Naval officers training in battle group operation decision making use this menu and display of the tactical positions of their forces in a battle simulation game.

The IBGTT software is supported by Nosc's Computer Support Facility (CSF), which consists of a pair of Digital Equipment Corp. VAX-11/780 minicomputers driving eight command centers. The two computers are each equipped with 8M bytes of core memory and share an additional 4M bytes of memory. This arrangement provides the CSF with a total of 20M bytes of memory and enables each computer to address 12M bytes. The CSF is also equipped with 1G byte of disk and tape mass storage.

Each command center contains a Megatek 19-in. color Whizzard 7250 computer graphics system that displays the current geotactical situation; four to six monochrome alphanumeric monitors, each of which can display any one of 21 status boards, such as air activity or the electronic countermeasures taken; an I/O terminal for communicating with the system; and an off-line internal communications system that simulates voice radio during the exercise, but is not in communication with the simulation computers.

During a typical exercise, five of the eight centers are assigned to the participating warfare commanders and coordinators for air, submarine and surface warfare and electronic countermeasures. Each of the command centers can run its own war game simulation independent of the other centers.

One of the three remaining centers is assigned to the enemy commander and another to the tactical officer in charge of the exercise. The eighth command center functions as central control, with its operator serving as the war game umpire, with complete and current knowledge of all the forces involved. The umpire also controls the actions of a third, neutral force. The data available to each center is continuously updated by the computers to ensure that the participants make their decisions based on the latest geotactical information.

Geotactical information is displayed on the Whizzard 7250 with friendly forces shown in blue and the enemy force in orange. The graphics system includes zoom capability for close-ups of the tactical situation. A menu presented on a display screen provides the participating officers with a color-coded listing of all available information query and command possibilities, from determining the position of ships to loading weapons on aircraft. Participants can select items from the menu through the Whizzard's graphics tablet.

In addition to the Whizzard 7250 color graphics terminal in each command center, there is also a large overhead color screen for general viewing. This display, a Lightvalve from the General Electric Co. Videodisplay Equipment Division, measures six feet on a side, enabling participants not actively involved to follow the action. The large-screen projection is driven by red-green-blue cables directly from the Megatek 7250 graphics system.

Gauging effectiveness

In order to determine the effectiveness of the tactics employed during the game by the participants, every significant position, threat, surveillance and communication is recorded.

Postexercise analysis provides a measurement of effectiveness that is used by fleet staff personnel to evaluate and critique individual and group performance. Among the criteria used in the evaluation are the location and status of all friendly and unfriendly forces and crossings of critical friendly thresholds by unfriendly forces.

Weight is also placed on how effectively friendly forces kept the unfriendly force under surveillance.

SPECIAL **REPORT**

Departments of transportation use interactive graphics

Survey researcher expects three-quarters of states to have systems within two years

By John Desmond
CW Staff

AUSTIN, Texas — A survey that studied interactive graphics systems at state departments of transportation, conducted by a consultant here for the second successive year, shows that 18 states have systems and 16 are planning to buy one within a year.

This compares with 1982 figures that showed a total of 14 state transportation departments were using interactive graphics systems and 16 planned to acquire a system within a year.

Eleven states replied in the 1982 survey that they had no plans to investigate the use of interactive graphics. Only one state, Connecticut, answered in 1983 that it would never investigate the use of interactive graphics systems.

"If things continue going the way they're going, within one or two years three-quarters of all the states will have interactive graphics," predicted Thomas M. Rioux, president of Rioux Engineering, Inc., who conducted the 1982 and 1983 surveys free of charge as a member of the Transportation Research Board of the National Academy of Engineering.

Fifty-one responses were received to the 52 surveys that were sent to the 50 states, Washington, D.C. and Puerto Rico. Puerto Rico did not respond. The state with the most interactive graphics experience is Mississippi, which obtained a system eight years ago. Michigan, New York and Texas each have had graphics systems for seven years, and Florida has had one for six years. All the other states with systems have had them for four years or less.

The primary interactive graphics applications within state transportation departments are drafting and mapmaking, the 1983 survey showed.

Most applications in 1982 were in roadway design, drafting, mapping, bridge design, accident analysis and traffic analysis and for planning mass-transit systems.

Productivity increased an average of 3.3 times in departments with interactive graphics, the survey showed. This productivity increase practically justifies the cost of an interactive graphics system, in Rioux's view. However, productivity in 1982 was shown to increase an average of 4.4 times for all applications, slightly more than the 3.3 average of the 1983 survey.

The average investment per CPU in 1982 was similar to 1983 — slightly less than $1 million per user — but by 1983 a total of $36 million had been spent by states on turnkey systems, the survey showed.

Money flowing into the states for highway work as a result of a 5 cent increase in the federal gasoline tax, which was put into effect recently, may be encouraging states to pursue interactive graphics, Rioux suggested. The state of Texas, alone, has nearly $1 billion to spend annually for highway construction and maintenance.

Interactive graphics is also causing states to look at different options in design, the survey showed, and that often leads to a lower construction cost, Rioux said.

The most popular system at state departments of transportation is the Intergraph Corp. system, which is used by 12 states. The next most popular is an IBM mainframe system used by five states.

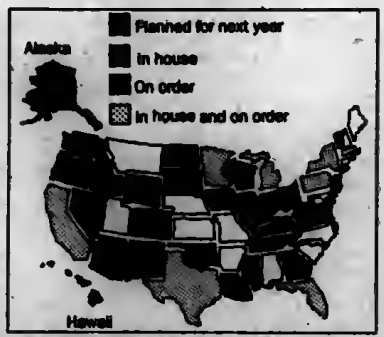
Because the most frequent question Rioux is asked by states interested in getting a system is how big it should be, much of the survey details the size of states' systems.

In the 17 states that have 32-bit CPUs, an average of 1.6 CPUs was involved in supporting or driving interactive graphics terminals; in states with 16-bit CPUs, the average was 1.3 CPUs. Average memory per CPU was 1.5M bytes for 16-bit systems and 3.9M bytes for 32-bit systems. The number of tape drivers averaged 1.77 per user and 1.08 per CPU for all respondents.

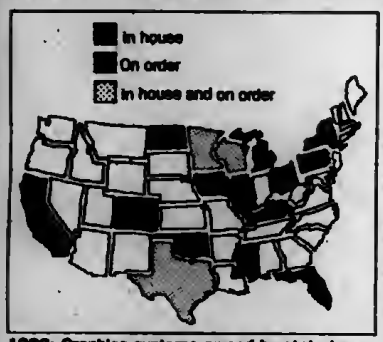
The total number of plotters averaged 1.78 per user and 2.41 per CPU. The total number of line printers averaged two per user and 0.89 per CPU. The average number of links for states with more than one interactive graphics CPU was 3.2 per user and 0.5 per CPU. States linking interactive graphics CPUs to other graphics CPUs averaged two links each. Only one state reported having a local-area network.

The average number of hours per day that the graphics terminals are in use ranged from six to 11. Sixty percent of those responding were using data base management systems along with their graphics systems. Most states were running jobs other than graphics on their interactive graphics CPUs, including interactive engineering applications, batch engineering applications and interactive text processing.

The survey is available free from Rioux Engineering, 6202 Lost Creek Circle, Austin, Texas 78746.



1983: Graphics systems owned by state transportation departments



1982: Graphics systems owned by state transportation departments

SPECIAL REPORT

Mapping system helps insurance firm assess its markets

COLUMBIA, Mo. — Executives here at Shelter Insurance Co. of Missouri are now using a custom-tailored marketing management information system to develop and present market research analyses.

The system integrates corporate information, statistical models and mapping procedures. Shelter's marketing system allows nontechnical managers to produce reports and maps for reviewing corporate performance, portraying geographical areas that meet particular criteria and identifying areas that offer new business potential.

In choosing the software for the marketing management information system, Shelter looked for a package to operate on its IBM 3081 computer. The system was finally designed with the base SAS, SAS/Graph and SAS/FSP products from SAS Institute, Inc.

Mapping capabilities

The SAS system was selected because, according to Shelter management, it provides extensive mapping and statistical capabilities. Combined, these capabilities help analysts and managers work together to understand Shelter's business environment.

The three products also help generate ideas for marketing alternatives used to adapt to that environment.

The foundation of Shelter's marketing system is a marketing research data base, consisting of two SAS data bases. The two data bases contain summary information from the company's detailed policyholder files: one data base for the current year and one for the previous year. Files from the two data bases are merged for analysis. Also included in the marketing research data base are demographic data, pricing data for Shelter's top competitors and summary data for savings and loan institutions.

Map data sets

Projected SAS/Graph map data sets contain coordinates of polygons for states, counties and sales districts and the names of counties and other places that would be used for labels on computer-generated maps. All programs in the system are written in the SAS language so that nontechnical managers can maintain and modify them without help from data processing professionals.

The marketing system also incorporates statistical models, consisting of a series of SAS macros that are structured to perform analysis. These models are combined with SAS/Graph procedures to produce territorial maps. The system has the ability to shade the maps to reflect how a particular area performs in comparison with expected levels. This capability lets managers compare their expectations with actual results.

"By analyzing and comparing plots for three variables [market penetration, company agent concentration and average agent productivity], we obtained new insight about the company's marketing position and the mix of marketing strategies we should consider to generate new business in different counties," said Vince Bartle, director of planning and research. "Thanks to the SAS/Graph product, we can assess decisions involving an area with the company's total marketing strategy in mind."

In updating the data bases, comprehensive reports are produced periodically. These reports describe the current status of business activities in each geographical area and the changes in status from the previous year. The marketing system also produces reports that are flexible in content and format and maps that give a geographical perspective to an area's attributes. These capabilities allow Shelter management to shift the focus from the entire marketing area to smaller segments.

The SAS macros provide users with outlines of computer programs written in a nonprocedural language. Modifications to the programs are effected by respecifying macros that define key parameters for SAS procedures.

For example, a macro can be invoked to direct the plot to a hard-copy plotter instead of to the user's screen. Thus, analysis can be performed at the terminal, prototypical maps and reports can be produced for study, and then hard-copy maps or reports can be directed to the company's printer/plotter or to its laser printer.

By subsetting the data set containing the variable to be mapped, the user can obtain maps of part of the geographic area. These can be magnified to fill a page of the prescribed size. Maps of the company's 13-state marketing area by county can be generated, then broken down by sales district. Maps of subsets of the area are automatically enlarged for detailed study.

With labels maintained on the SAS data sets to serve as headings for variables, reports are automatically formatted by the base SAS product to fit into the space that is available on a page.

SPECIAL **REPORT**

End-user business graphics calls for MIS attention

By Raymond E. Jacques
Special to CW!

Business graphics is already playing an important role in many of today's information systems departments. The explosive growth of business graphics technology and end-user computing technology will result in business graphics playing an even more significant role in the future. The information systems executive must plan effectively for business graphics support and growth.

End-user business graphics produces art that will be used for management reporting and presentations. These graphs will usually appear in the form of plots on paper, 35mm slides or overhead foils.

End-user graphics are generally created directly by the person who is going to use them. The graphs are usually created by a first-level professional or perhaps by a clerical person or a secretary.

End-user computing currently represents 10% of the typical information systems budget today. IBM and several consultants predict that by 1990, 80% of total information systems expenditures will be for end-user computing. Currently, business graphics at General Mills Corp., and probably at most large corporations, is the second or third largest end-user computing application. The role of business graphics will continue to grow, since graphics provide a very effective solution for management reporting and other business needs.

End-user graphics is also creating a demand for production graphics. Production graphics produce graphics to replace data processing reports that are usually generated on a high-speed printer. Managers are seeing how effective graphics can be, and they would like to use graphics as part of their normal reporting procedures.

Important issues

Some of the more important issues surrounding end-user graphics are:

- Why are end-user graphics so important in the first place?
- How much of a role should the information systems department play in end-user computing, including end-user business graphics?
- What are the application trade-offs of business graphics produced on the micro vs. graphics produced on the mainframe vs. graphics produced via the various office automation tools that are available? Which one of these is better?
- How do you effectively make the data on mainframe computers available to the users of business graphics?
- How much support should the information systems department provide business graphics users? This could include application planning, purchasing assistance, formal training, informal coaching, demonstrations of tools and operational support.
- How should the information systems department charge for the support it provides to users?

There are several advantages to business graphics. The key advantage of business graphics is that graphics will get the point across much better than the tabular reports usually used by the information systems department. This is particularly important when the report contains complex data. A second benefit of business graphics is that graphics make it easier to develop a user-friendly interface between the user and the business systems. Finally, computer-generated business graphics are actually easier to read, cheaper, more accurate and faster than graphics done by hand.

Jacques is manager of end-user computing in the Consumer Goods Group of General Mills Corp. in Minneapolis.

SPECIAL REPORT

Computer graphics fertile ground for entrepreneurs

By Jeffrey Graber
Special to CW

Armed with the twin power of cheap chips and voluminous venture capital, practically anyone with a pair of pliers and a good idea can find a chance to set a trend or carve a new niche in the computer graphics field.

That computer graphics is a major factor in the computer world is now an indisputable fact. Fueled by reduced memory costs, increased computer power and increased user demand for graphics as an integral computer feature, the computer graphics industry continues to grow at record rates. The graphics market was greater than $3 billion in 1983, and it is expected to grow at a hefty 30% to 50% through the 1990s, depending on the application sector.

Yet, while the computer graphics field has become established, the technological and application possibilities are just opening up.

As indicated in the 1984-85 edition of the "S. Klein Directory of Computer Graphics Suppliers," dozens of new companies have sprung up in the last year alone, offering a wide range of computer graphics products — from workstations to dedicated, very large-scale integration graphics chips, artist paint systems and personal-computer-based, computer-aided design and manufacturing (CAD/CAM) systems. These companies were powered up by an infusion of venture capital and equity that totaled over $200 million, according to a tally kept by the "S. Klein Newsletter on Computer Graphics."

Over the past two years, for example, workstations have tended to be based on the Motorola, Inc. 68000 microprocessor. Now, the new "chip on the block" in workstation design is the National Semiconductor Corp. 16000 series.

This chip is a 32-bit microprocessor that utilizes the Unix operating system as well as C and Fortran, among other languages. At opposite ends of the country, two start-ups — Mosaic Technologies in Billerica, Mass., and Syte Technology in San Diego — have garnered equal $5 million venture funding to develop workstations based on the National Semi chip.

Left large firms

The founding entrepreneurs at both companies left important positions at larger companies; the Mosaic team from Perqu Systems, Inc. and Syte people from Megatek Corp. Indeed, the trend of industry leaders departing one computer graphics company to start another is rampant.

Computer graphics entrepreneurship is also based on the sundry graphics standards that are evolving.

The videotex standard, known as the North American Presentation Level Protocol Standard (NAPLPS), too, has given birth to entrepreneurs. In particular, Verticom, Inc. offers graphics terminals whose distinguishing feature is inherent NAPLPS compatibility.

And in CAD/CAM, the Iges standard has spawned General CAD/CAM, Inc., a spin-off company from General Electric Co. whose specialty is to assist users in applying that data interchange standard.

At the opposite end of the scale, the personal computer, exemplified by the IBM Personal Computer and Apple Computer, Inc. products, is only now beginning to spawn new computer graphics companies. These micros have become the CPU for very cost-effective CAD systems.

In the fast-paced field of computer graphics, the fleet-footed entrepreneurs continue to lead the way, developing new directions and new products that expand the industry's limits.

Graber is assistant editor of the "S. Klein Newsletter on Computer Graphics," published in Sudbury, Mass.

ABC group turns to graphics for help at budget time

NEW YORK — The screen blips. Introduction music swells. A businesslike personality appears on camera. Smooth delivery. Pleasant, serious demeanor. His voice continues rapid-fire as the screen yields to brilliantly colored charts. Familiar music from a prime-time serial introduces a segment from that show. The scene fades.

A clip from the latest docu-drama? No, a sales presentation heavy with research data. Television techniques are rubbing off on internal management and sales at American Broadcasting Co. here.

It started five years ago, when Michael Hudak, then a research director for WABC-TV, found a better way to present ratings information to time buyers. He replaced rows of eye-straining tabulations with graphs and charts that interpreted the data. This way, overnight ratings could be packaged and ready for sales representatives the next day.

But this was only the beginning. He also found a way to record his colorfully displayed graphs on videotape.

Now director of research for ABC-owned and -operated stations, Hudak plans similar packaging of overnight ratings charts for each of the ABC-owned markets as well as for spot sales.

Chart-Master from Decision Resources, Inc. of Westport, Conn., is the graphics package Hudak uses to introduce his graphs.

Hudak's success in upgrading sales presentations with videotaped computer graphics has not gone unnoticed by colleagues. While internal management areas do not necessarily need the speed with which the graphics software can produce daily updated materials, they do need to enhance corporate communications.

Presentations were never more crucial than they were this year for David Rosen, automated systems coordinator in ABC Corporate Communications. He cites graphics as increasingly indispensable in convincing management to fund resources needed to arrive at complex systems recommendations.

Divisions are always competing for their pieces of the corporate budget pie, but the AT&T divestiture is forcing increases in ABC Corporate Communications' budget at a time when the corporate dictum was for trims. Between 20% to 25% budget increases may result from the divestiture, Rosen said, which is consistent with industry-wide projections.

Corporate Communications at ABC has to cover a vastly increased data load due to the divestiture. Competitive bids will have to be sought and extensive data analyzed. Outside contractors have to be hired, Rosen said. "We will have to search for competitive systems in a lot of areas where we didn't before," Rosen said. "So one of the biggest things we have to sell management is our professionalism," he added. "Presenting data graphically is a step in the right direction." He does it using Chart-Master software on an IBM Personal Computer and a Hewlett-Packard Co. 7470A two-pen plotter.

"Some data is too detailed for a good presentation," Rosen said. "Graphics show the trend, the scope of a project in better detail. Management likes to see that." They also like to see numerical definition of trends, Rosen said, so he inserts figures on chart components.

He credited the graphics package as a boon in getting through the budget process. "Charts paved the way in explaining our costs," he said.

Just how cost-effective are the graphs? "You get more information to management in less time," Rosen said. And, he continued, visually oriented presentations generate fewer requests for supportive data.

If you miss the next 3 issues of CW Office Automation, look at the issues you'll miss

August

In this issue we'll look at microcomputer and word-processing software, using product reviews and case histories. Plus, we'll show readers how to decide which products meet their current and future needs.

Closes: July 6

October

Readers will get the latest on integrated workstations and word processors. We'll make product comparisons, evaluate systems, and examine equipment capabilities. And we'll discuss hardware compatibility, hardware upgrades, and cost-justification ideas.

Closes: August 31

December

Coverage includes: user interfaces, natural languages, data bases, decision support systems, information centers, and artificial intelligence. Also, we'll highlight user solutions and vendor trends as we consider the current and future benefits of systems software.

Closes: October 26

Call the Sales Office nearest you to reserve space for your ad, or to get more information. Or fill out the coupon below and return it to: Ed Marecki, National Sales Director, Computerworld, 375 Cochituate Road, Box 880, Framingham MA 01701. Do it today.

To: Ed Marecki, National Sales Director
Computerworld
375 Cochituate Road, Box 880
Framingham MA 01701

☐ Please send me advertising information on:
- ☐ the Applications Software issue
- ☐ the Workstations issue
- ☐ the Systems Software issue

☐ Please have a sales representative call me.

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____ OA

Computerworld
OFFICE AUTOMATION

BOSTON: 375 Cochituate Road, Box 880, Framingham MA 01701 (617)879-0700
CHICAGO: 2600 South River Road, Suite 304, Des Plaines IL 60018 (312)827-4433
NEW YORK: Paramus Plaza 1, 140 Route 17 North, Paramus NJ 07652 (201)957-1350
ATLANTA: 1853 Peeler Road, Suite D, Atlanta GA 30338 (404)394-0758
SAN FRANCISCO: 300 Broadway, Suite 20, San Francisco CA 94133 (415)421-7330
LOS ANGELES: 18008 Sky Park Circle, Suite 260, Irvine CA 92714 (714)261-1230

Now that we're published monthly, you have twice the opportunity to reach the communications market...

and starting this July you'll get an additional 20,000 readers at no extra cost *

August

We'll look at full motion video, freeze frame, electronic blackboards, and computer conferencing. Plus we'll examine the cost-effectiveness of these technologies, and provide information on private and public facilities.

Closes June 29

September

We'll study how business communication carriers and users can put voice, data, and other traffic on the thousands of miles of existing CATV cables. CATV loops are a viable alternative to those offered by the Bell Operating Companies.

Closes August 3

October

Communications networks are switching to all-digital. AT&T and MCI are using fiber-optic-based transmissions and satellite services. We'll explore how these changes affect users, and what the opportunities are for vendors.

Closes August 31

Call the Sales Office nearest you to reserve space for *your* ad, or to get more information. Or fill out the coupon below and return it to: Christopher F. Lee, Associate Publisher, *Computerworld On Communications*, 375 Cochituate Road, Box 880, Framingham, MA 01701. Do it today.

* Call your Computerworld Sales Representative for details.

To: Christopher F. Lee, Associate Publisher
Computerworld On Communications
375 Cochituate Road, Box 880, Framingham MA 01701

Please send me advertising information on:

- ☐ the Teleconferencing issue
- ☐ the CATV issue
- ☐ the Digitizing America issue

☐ Please have a sales representative call me.

Name _____

Title _____

Company _____

Address _____

City _____ State ____ Zip ____

Telephone _____

Computerworld
On Communications

BOSTON: 375 Cochituate Road, Box 880, Framingham MA 01701, (617) 879-0700
CHICAGO: 2600 South River Road, Suite 304, Des Plaines IL 60018, (312) 827-4433
HOUSTON: 8401 Westheimer, Suite 110, Houston TX 77063, (713) 952-1220
NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus NJ 07652, (201) 967-1350
ATLANTA: 1853 Peeler Road, Suite D, Atlanta GA 30338, (404) 394-0758
SAN FRANCISCO: 300 Broadway, Suite 20, San Francisco CA 94133, (415) 421-7330
LOS ANGELES: 18008 Sky Park Circle, Suite 260, Irvine CA 92714, (714) 261-1230

COMMUNICATIONS

WIRE TAP
John Dix
CW Senior Editor

GTE launches hybrid satellite

Coincidently, and justly fitting, a satellite of an older generation was retired earlier this month days after a bird of another generation took to wing.

RCA American Communications, Inc. used the last of Satcom I's on-board fuel supply to nudge the satellite out of geosynchronous orbit. This will slow the craft down, elongate its orbit above the equator and slowly take it deeper into space.

Satcom I was the first domestic communications satellite to carry 24 transponders, twice that of its predecessors. A transponder can be used to carry any type of communications — including multiple high-speed data channels — but in its heyday, Satcom I was used to usher in the CATV industry.

Using a single transponder, a Satcom I user like Home Box Office could simultaneously distribute a full-motion video signal and accompanying sound to multiple locations.

In its new orbit, Satcom I will be safely out of the way of other communications satellites serving North America, which hang in the heavens 23,000 miles above the equator. At this altitude, the crafts obtain a geosynchronous orbit — synchronized with *geo*, the Greek root for earth — and appear stationary from the ground, making them available for constant use.

When Satcom I was launched in 1975, it weighed 1,915 pounds, 400 pounds more than its predecessors. Spacenet I, the first-of-its-kind satellite launched in May by GTE Spacenet, a division of GTE, weighed 2,634 pounds at launch. In orbit, its solar panel wingspan will be 47 feet.

While having the same number of transponders as Satcom I, Spacenet I is the first domestic communications satellite to carry transponders that operate at different frequencies. The bird has both C-band transpooders, which operate at 4 and 6 GHz, and Ku-band transponders, which operate at 12 and 14 GHz.

C-band has typically been used in the

See GTE page 66

Xerox adds IBM micro support

Offers terminal emulation, remote batch software

By John Dix
CW Staff

PALO ALTO, Calif. — Xerox Corp. recently announced communications products that provide for the direct support of IBM Personal Computers on Ethernet and software that enables a Xerox Star workstation to emulate two widely used terminals.

A remote batch product was also announced to provide multivendor document interchange.

The company reported that 3Com Corp. of Mountain View, Calif., would provide hardware to connect IBM Personal Computers directly to Ethernet. Together with 3Com, Xerox is developing software to enable users to create documents on a Personal Computer and then access Ethernet network services for electronic printing, filing, electronic mail and mainframe access.

With the new software, users of Xerox 8010 Star workstations can emulate IBM 3278 display terminals and Digital Equipment Corp. VT100s. The Star's windowing capability enables a user to access simultaneously up to six programs on as many Ethernet-based hosts.

Sessions supported are not dependent on the type of hosts and protocols used. "An asynchronous or [teletypewriter] emulation session can be supported in one window using typical asynchronous virtual terminal circuit protocols, while [Systems Network Architecture] is happening in another session using an [IBM] 3270 data stream," explained Larry Garlick, manager of communications services in Xerox's Office Systems Division.

Data from a window representing one ongoing session can be captured and copied into another window, even if one session is supported by a DEC system and the other by an IBM computer, a company spokesman said.

According to Garlick, unlike the IBM 3270 Personal Computer, the Star is not tied to a particular server. The 3270-PC is dependent on a cluster controller that enables it to access up to four sessions, all in the same place, he said. With an Ethernet-based Star, the Xerox workstation can access up to six independent servers.

The newly announced remote batch service, according to the company, is designed to provide for document interchange in a multivendor environment.

The service uses IBM 2770/2780/3780 protocols and can be used to transfer information on an IBM mainframe to a Xerox network system for enhancement, a spokesman said. Additionally, information created on a Xerox system can be sent to a mainframe for processing or archiving.

See XEROX page 66

Bypass technology seen on the rise

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Opinions differ on whether bypass is a clear and present danger to local telephone companies, but some analysts are predicting bypass will increase substantially in the next few years.

Jerry Lucas, president of Telestrategies, Inc., a McLean, Va., consulting firm that specializes in tracking bypass developments, discussed the subject at a conference held here earlier this month by his firm.

About 40% of the revenue earned by U.S. communications carriers from long-distance services is paid by users located within the central business districts of the nation's 100 largest cities, Lucas explained, adding that bypass systems are now operating, under construction or planned in most of these cities.

Lucas cited Dallas as an illustration of what is, or shortly will be, happening elsewhere:

Within a one-square-mile area of downtown Dallas are 79 buildings whose occupants pay $107 million/year in long-distance communications charges. By the end of 1984, this area will be served by a CATV network, four "teleports" (satellite earth stations) and three digital termination systems. Lucas' point was that the concentration of traffic will make it easier for these new carriers to bypass the local telephone network.

Ten of the buildings already have announced plans to offer their tenants bypass facilities by the end of this year, Lucas reported. These "intelligent buildings" are particularly significant, he said, because they provide a way of consolidating traffic generated by many smaller volume users into a total large enough to make bypass facilities economically feasible.

See LUCAS page 66

AT&T unveils Commkit line for Unix System V users

NEW YORK — AT&T Technologies has announced its Commkit line of communications and networking software, which is designed for Bell Laboratories' Unix System V users.

Commkit Software-Synchronous Terminal Interface permits a variety of Ascii- and Ebcdic-compatible terminals and printers to communicate with AT&T Technologies 3B computers and other minicomputers running under Unix System V, according to a spokesman from AT&T Technologies.

Commkit Software-Ethernet Interface is said to support the Ethernet local-area network in Digital Equipment Corp. VAX-11 computers running under Unix System V.

It provides batch file transfer and remote command execution and permits communication between other Ethernet-compatible machines in a multivendor environment, the AT&T Technologies spokesman said.

Commkit Software-Hyperchannel Interface connects AT&T 3B20 computers or other minicomputers running Unix System V and the Network Systems Corp. Hyperchannel high-speed, local-area network, according to AT&T.

The package is said to provide peripherals sharing, centralized administration, file transfer and remote execution.

All three packages will be available in source code during the third quarter of 1984.

The synchronous terminal interface and Ethernet interface are priced at $5,000 each, and the Hyperchannel interface is priced at $10,000.

AT&T Technologies is located at 222 Broadway, New York, N.Y. 10038.

COMMUNICATIONS

CONTROLLERS

TELERAM COMMUNICATIONS CORP.
Starlink

Teleram Communications Corp. recently announced a shared storage device for use with its line of terminals, including its 3100 portable terminals, that can also be used to transfer formatted data to other locations.

Starlink is available with 17M to 320M bytes of Winchester disk storage and allows connection of up to 24 on-site terminals and access by an unlimited number of remote terminals, according to the vendor.

Using Teleram's Data Storage System software and Zilog, Inc.'s storage devices, Starlink reportedly allows users to create common files, add to existing files, use portions of files and transmit messages. Starlink is designed to recognize terminal priority and limit file access where desired, the vendor said.

Available in eight-port, 16-port and 24-port units, Starlink is scheduled for delivery in July. A basic configuration of four terminals, 17M bytes of disk capacity and eight ports is priced from $30,000 to $35,000, depending on the model terminal selected.

Teleram, 2 Corporate Park Drive, White Plains, N.Y. 10604.

NCR COMTEN, INC.
SS1 R5; EP4 R5 enhancements

NCR Comten, Inc. has announced enhancements for its data communications software: Comten Start-Stop 1 Release 5 (SS1 R5) and Comten Emulation Processing Release 5 (EP4 R5).

SS1 R5 is said now to support high-speed asynchronous lines that link color graphics terminals and personal computers to data centers through the Comten Asynchronous Modem Interface Module and through the Comten Data Link Control Modem Interface Module.

When used with other Comten EP4 programs, SS1 R5 reportedly provides for switched and dedicated line connection, application switching, automatic dialing, global and application-dependent message processing and statistics gathering.

The Comten EP4 R5 is said to give users increased data throughput. It reportedly performs data-handling tasks between bisynchronous and asynchronous terminals and one or more IBM host computers.

Both software products reside in a Comten 3600 communications processor, which can support up to eight host computers and a variety of communications devices. They will be available during the fourth quarter.

Comten EP4 R5 is a no-charge licensed software product. The license fee for the Comten SS1 R5 is $81/mo or $891/year.

NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

VOICE/DATA COMMUNICATIONS

CABLESHARE, INC.
Tesys-1; Tesys-5

Cableshare, Inc. has announced packet switches to enhance its line of X.25 communications interfaces.

Designed for use in public or private packet-switched networks, the Tesys-1 and Tesys-5 switches are said to implement X.25, X.75, X.3, X.29 and X.121 protocols. They also reportedly support IBM environments by providing Systems Network Architecture/Synchronous Data Link Control support for IBM 3270 and IBM 3780-type devices.

The network nodes and concentrators are said to feature a modular design consisting of 34 packet-switching blocks with each block using an Intel Corp. 80286 processor.

A Tesys-5 node allows connection of up to 1,496 synchronous or asynchronous devices operating at speeds up to 64K bit/sec, while the Tesys-1 can support up to 44 devices, according to the company. Prices start at $40,000.

Cableshare, P.O. Box 5880, 20 Enterprise Drive, London, Ont., Canada N6A 4L6.

UNITED TECHNOLOGIES COM DEV
8200 series additions

United Technologies Com Dev has announced two mid-range models for its 8200 Call Accounting Series Telecommunications Processor family.

The TP8234 serves 250 stations and stores up to 10,000 call records, while the TP8235 serves 250 stations and stores up to 20,000 call records, according to the company. The TP8234 reportedly can be used outside of the U.S. with the addition of Com Dev's Universal Rating Module 1 software option.

Both models can be equipped with a line scanner option and run either the Com Dev Callquest II or Com Dev Hotel/Motel applications package. Available now, the TP8234 costs $4,900, and the TP8235 costs $5,960.

United Technologies Com Dev, 2006 Whitfield Industrial Way, Sarasota, Fla. 33580.

SOFTWARE

RHINTEK, INC.
EMU

Rhintek, Inc. has announced an emulator designed to let the IBM Personal Computer and its compatibles emulate the Data General Corp. D2000 terminal.

The EMU software is said to support speeds of up to 19.2K bit/sec and to be implemented in machine lan

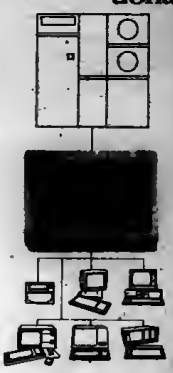
Continued on page 64

EVERYONE WHO WANTS TO USE THE COMPANY MAINFRAME RAISE YOUR HAND.

Introducing power to the people.

Better known as the Data Pipeline™ from Intel.

It's based on our iDIS™ Database Information System. A powerful, integrated package of hardware and software with multi-user capability built right in. And now, through iDIS, just about any pc or terminal can easily share data with just about any mainframe.



Our Data Pipeline™ allows practically any pc to share data with practically any mainframe.

With the iDIS Pipeline, you'll be able to establish and manage your pc-to-mainframe connections in a way never before possible. Yet you'll still be able to offer department users a fair degree of independence. Since iDIS comes with all the software they need. Starting with the Xenix® operating system, built around a relational DBMS. Plus the Multiplan® spreadsheet, word processing, electronic mail, and a forms/menu development tool.

The iDIS Pipeline is powerful, too. Each one will handle 5 full-time users, or between 12 and 15 on dial-up. And you can even network with other iDIS systems. But you're always in control. You decide which data are accessible, and extract only those to your iDIS system. Users then access their data sets from iDIS's hard disk.

Actually, using the iDIS Pipeline is a lot like giving users their own little mainframe.

Which is a lot better than giving them yours.

It's also a lot cheaper.

Less than half the cost of a direct pc-to-mainframe connection.

It's also fully supported and serviced from one responsive source. Us. Best of all, it's available now.

For more information about how our iDIS Data Pipeline can help you manage the revolution in your office, call us at 800-538-1876; in California, 800-672-1833. Or write Intel, Lit. Dept. H-18, 3065 Bowers Ave., Santa Clara, CA 95051.

Of course, if you're undecided about what to do you can always ask for a show of hands...

intel

** According to the Gartner Group, who took the time to figure out all the hidden costs, each direct pc-to-mainframe connection costs approximately $12,000. Xenix® and Multiplan are trademarks of Microsoft Corporation. © 1984 Intel Corporation.

RHINT from page 62

gauge. It reportedly bypasses the IBM DOS and Bios functions to display quickly and transfer a file to disk.

Designed for direct connection, it is said to allow remote communications and to feature automatic dial support for autodial modems, single-key redial and single-key logon.

The software is distributed on a non-copy-protected diskette that allows installation on a fixed disk.

The binary license for use on one machine is $115. Multiuser licenses, source licenses and customized versions also are available.

Rhintek, P.O. Box 230, Columbia, Md. 21045.

MULTIPLEXERS/MODEMS

WOLFDATA, INC.
WD-212-X

Wolfdata, Inc. has announced a synchronous/asynchronous 1,200 bit/sec modem featuring AT&T 212A and 103 protocols and also the CCITT X.25 link-access procedure (balanced) error-correction protocol.

The WD-212-X modem was designed to connect IBM's and others' personal computers and data terminals to packet networks, mainframes and other personal computers, according to the vendor.

The modem's multiple-microprocessor design is said to enable it to adjust automatically to telephone line operating conditions.

It also includes direct connect, autodial/autoanswer features that allow computer-to-computer and remote data access and local-area network communications, the vendor said.

The WD-212-X is available as a stand-alone modem or as a printed-circuit board for use in the IBM Personal Computer, according to a Wolfdata spokesman.

Prices start in the range of $345 in OEM quantities.

Wolfdata, 187 Billerica Road, Chelmsford, Mass. 01824.

NETWORK SERVICES

RCA CYLIX COMMUNICATIONS NETWORK, INC.
Dial Backup

RCA Cylix Communications Network, Inc. has announced its Dial Backup system for users of its satellite-based, value-added data communications network.

It is said to allow users to set up temporary landline links between their host computers and remote terminals when their dedicated circuit service is interrupted.

According to the company, dial backup equipment at the customer site consists of a dial backup unit, a multiple-line telephone and cables connecting the equipment to an RCA Cylix modem.

Two dedicated, switched telephone lines and a dedicated ac duplex outlet also are required at each user site, according to the vendor.

The dial backup line transmission speed is 4,800 bit/sec, according to RCA Cylix.

Charges are a one-time installation fee of $325 per host and $250 per remote terminal, a monthly access charge of $200 per host and $60 per remote terminal and a monthly surcharge of $15 per million characters in prime time and $7.50 per million characters in non-prime-time.

RCA Cylix, 800 Ridge Lake Blvd., Memphis, Tenn. 38119.

TEST EQUIPMENT

DIGILOG, INC.
Model 200; Model 400

Digilog, Inc. has announced two protocol analyzers that are said to set up automatically, decode and analyze protocols and test and identify faults.

The Model 200 and Model 400 both feature remote control and comprehensive bit-error rate test.

They cost $4,995 and $7,495, respectively.

Digilog, 1370 Welsh Road, Montgomeryville, Pa. 18936.

AUXILIARY EQUIPMENT

DIGITAL PATHWAYS, INC.
Defender II/Model 8

Digital Pathways, Inc. has announced an eight-line,

COMMUNICATIONS

dial-in computer security system designed for use in small organizations.

Defender II/Model 8 is said to be the lowest cost member of the Defender II family of security products. It was designed for use as a stand-alone unit protecting up to eight outgoing telephone lines or as a slave unit in a larger dial-in network. The system requires a caller identification number and a Defender-generated callback before access is allowed.

Scheduled for shipments in late July, Defender II/Model 8 is priced at $3,600, the vendor said.

Digital Pathways, 1060 E. Meadow Circle, Palo Alto, Calif. 94303.

FIBRONICS INTERNATIONAL, INC.
Model FM 1601

Fibronics International, Inc. has announced a fiber-optic data link modem designed to extend the working distance between a computer controller and its terminals and printers.

The Fibronics Model FM 1601 is said to interface with any coaxial or twinaxial cable-connected device and its controller. It reportedly allows IBM System/34 through System/38 or IBM 5520 user to string remote terminals up to one mile with fiber-optic cable.

It also reportedly allows use of an IBM 5250 computer-aided design and computer-aided manufacturing systems and IBM 3270-type devices.

With the addition of a Fibronics Coaxial Doubler, the 1601 is said to become a two-port fiber-optic multiplexer for the IBM 3274 controller, System/34 through System/38 and the ITT Courier Systems, Inc.'s 7411.

Prices for the Model FM 1601 start at $1,100.

Fibronics International, 225 Stevens St., Hyannis, Mass. 02601.

EMC CORP.
EMC 5258

EMC Corp. has announced an enhanced communications interface for Prime Computer, Inc. systems that is said to enable up to 32 asynchronous channels to be supported from a single card slot.

The EMC 5258 reportedly doubles the capacity of Prime's asynchronous multiline controller and queuing asynchronous multiline controller (QAMLC) terminal interfaces, while requiring less power than a single QAMLC card. It is designed to operate under Prime's high-speed direct-memory queue and direct-memory transfer modes.

According to the vendor, the EMC 5258 lets the Prime user add communications capability without having to add a new card cage and power supply and can be used to free additional chassis slots for other I/O uses.

It features 16 standard speeds up to 19,200 bit/sec for any channel and an option to program transmission rates for special applications. It is said to include an on-board microprocessor and an EMC-designed connector panel using RS-232C connectors.

The 32-channel 5258 costs $6,500, while a 16-channel version costs $4,200.

EMC, 12 Mercer Road, Natick, Mass. 01760.

TELEBYTE TECHNOLOGY, INC.
Model 63-3H; 63-4H

The Remark Datacom Division of Telebyte Technology, Inc. has announced two RS-232 to RS-422 conversion devices.

Models 63-3H and 63-4H are said to be configured individually to operate as data terminal or data communications equipment, providing the link needed to couple RS-422 to RS-232 units.

Now available, the converters are $96 each, or $78 in quantities of 100.

Telebyte Technology, 148 New York Ave., Halesite, N.Y. 11743.

UNITED TECHNOLOGIES COM DEV
Dispatcher

United Technology Com Dev has announced Dispatcher, a device that dials a preprogrammed telephone number and delivers a text message.

Dispatcher reportedly can be used with telecommunications equipment, computers, energy management systems or other equipment that has either an alarm contact or an RS-232C maintenance interface.

Scheduled for delivery in late July, it costs about $600 in OEM quantities.

United Technologies Com Dev, 2906 Whitfield Industrial Way, Sarasota, Fla. 33580.

XEROX from page 61

Documents can be exchanged with other mainframes, word processors and workstations that support the IBM protocols and formats, the company reported.

The IBM Personal Computer operating on Ethernet will be demonstrated at the National Computer Conference in Las Vegas in July. The 3Com board and software for the Personal Computer cost $795. Product orders will be taken beginning in September. Customer installations are slated to begin in November.

The terminal emulation and remote batch service software will be available in October. Prices for these incremental software features range from $200 to $1,500, the company said.

Information is available from Xerox's Office Systems Division, which is located at 3333 Coyote Hill Road, Palo Alto, Calif. 94304.

LUCAS from page 61

According to Lucas, a year ago only two intelligent building projects were announced in Dallas; today a total of 16 are under way. This is taken as an indication of how fast bypass is spreading. Lucas expects that by the end of 1985, a total of 287 intelligent buildings will be in place or under construction throughout the U.S. By comparison, at the end of April 1984, only 72 were being built, Lucas said.

The major push behind bypass is economic, Lucas said. If a user accesses AT&T's long-distance network through his local telephone company's dial-up facilities, he now pays a carrier common-line charge averaging 8.4 cent/min.

As a result, business users and long-distance carriers are now looking eagerly for "last-mile" connections that cost less than 3.4 cent/min.

The most innovative alternative, Lucas said, is MCI Communications Corp.'s Cablephone service. It enables a user equipped with a Touch-Tone telephone to communicate via CATV with the local terminus of MCI's long-distance network. The cost of each subscriber connection is $10/mo, Lucas said. For residential users, whose long-distance calls average 110 min/mo, Cablephone presently offers little saving. But for business customers, whose average usage is considerably higher, there's a real benefit. For a company whose usage totals 890 min/mo, for example, the Cablephone cost is less than 2 cent/min.

The present Cablephone system multiplexes a 6 MHz television channel into 240 analog voice circuits, Lucas reported. Through use of demand-assignment techniques, up to 2,400 users can be served on each channel.

MCI is now leasing Cablephone facilities from five CATV networks and is paying them about $700,000/mo, according to Lucas. While the service can be offered only in cities that have two-way cable systems, he pointed out that all systems built since 1981 have this capability.

GTE from page 61

telephone and broadcasting industries. Unfortunately, the frequencies in this range are also typically used for terrestrial microwave communications. This has served to make it nearly impossible to beam a satellite signal into a metropolitan area where microwave traffic is particularly congested.

This fact contributed to the development of Ku-band technology. Satellite Business Systems (SBS) was the first domestic carrier to launch satellites using these frequencies. Consequently, SBS became the first carrier to offer communications services directly into microwave-congested cities.

GTE Spacenet's hybrid satellite will enable the company to support existing networks that use the lower frequency C-band, as well as new systems operating at the higher frequencies, the company reported.

Two other Spacenet satellites are scheduled for launch later this year and in early 1985. The price tag for the whole system, including construction of a spare bird, is said to exceed $300 million.

GTE acquired Spacenet when it bought the Southern Pacific Communications Corp. from Southern Pacific Railroad. The primary reason for the acquisition was to purchase Sprint, the long-distance discount telephone network that was held by that company. GTE Satellite, another GTE division, also plans to launch two Ku-band satellites during 1984-85.

If you're not in *Computerworld's* next five special reports, look at the issues you'll miss

July 16

NCC Wrap-up Issue
Part 2 of *Data Pro's* hardware survey. Also, we'll recap the major product announcements and happenings at the show.
Closes June 25

August 27

Minis and small business systems
We'll take a close look at the growing number of applications available. Plus we'll include reports from users on the problems they've had in selecting and implementing these systems, and how they solved. Also, we'll offer vendors' suggestions on how to increase the efficiency and cost-effectiveness of minis and small business systems.
Closes August 10

September 24

Data Base Management Systems
A comprehensive report geared toward a realistic understanding of DBMS. We'll include articles from users and industry experts on how to evaluate, select, implement, and trouble-shoot DBMS. And we'll update recent developments, as well as offer users' solutions to common and not-so-common DBMS problems.
Closes September 7

October 29

Protecting the Corporate Information Resource
We'll discuss how to protect hardware & software resources, people resources, and physical plants. There'll be articles on: uninterruptible power supplies, data security monitors, data encryption software, disaster recovery centers (offsite data storage), fault-tolerant processing, data transmission security, protecting the computer room, and contingency planning.
Closes October 12

November 26

Data Communications Terminals
Users and vendors will comment on how terminals are making computers more responsive to organizational needs. Topics include: how to get the most out of dumb terminals; an update on smart and intelligent terminals; and guidelines for determining terminal needs and selecting the equipment to meet them.
Closes November 9

Call the Sales Office nearest you to reserve space in any of our upcoming issues. Or, if you prefer, fill out the coupon below and return it to: Ed Marecki, National Sales Director, Computerworld, 375 Cochituate Road, Box 880, Framingham MA 01701. Do it today.

To: Ed Marecki
National Sales Director
CW Communications/Inc.
Box 880/Framingham MA 01701

Please send me advertising information on:
- ☐ *NCC Wrap-up* issue
- ☐ the *Minis and Small Business Systems* issue
- ☐ the *Data Base Management Systems* issue
- ☐ the *Protecting the Corporate Information Resource* issue
- ☐ the *Data Communications Terminals* issue
- ☐ Please have a sales representative call me.

Name _____
Title _____
Company _____
Address _____
City _____ State ____ Zip _____
Telephone _____

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Sales Offices

BOSTON: 375 Cochituate Road, Box 880, Framingham MA 01701, (617) 879-0700; CHICAGO: 2600 South River Road, Suite 304, Des Plaines IL 60018, (312) 827-4433; NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus NJ 07652, (201) 967-1350; ATLANTA: 1853 Pecler Road, Suite D, Atlanta GA 30338, (404) 394-0758; SAN FRANCISCO: 300 Broadway, Suite 20, San Francisco CA 94133, (415) 421-7330; LOS ANGELES: 18006 Sky Park Circle, Suite 260, Irvine CA 92714, (714) 261-1230 HOUSTON: 9401 Westheimer, Suite 110, Houston, TX 77063, (713) 952-1220.

"How I increased user satisfaction with the flick of a switch."

Introducing The Honeywell Solution Center.

Now there's a way you can increase the satisfaction of your end users and improve the responsiveness of your information management system. It's called a Solution Center.

A Solution Center is a user-support facility that enables personnel throughout your organization to do their own data processing, quickly and easily. And it enables you to give them direct but controlled access to online information.

Increases Productivity

A Solution Center features Honeywell's GCOS8 software that ranges from personal productivity and decision support tools to business-specific solutions. So now your end users can build their own spreadsheets, forecast trends with color graphics, browse through online files, and create or revise reports.

Think of how that could increase their productivity as well as their satisfaction. And, by freeing the MIS staff to do more of the significant tasks they were hired to perform, a Solution Center can increase the productivity of your data processing department, too.

Improves Data Management

A Solution Center improves data management by providing consistent information to end users and by eliminating unnecessary application development. It can facilitate the introduction of personal computers. And, best of all, you can tailor it to meet your specific needs.

With a Solution Center, end users get the information they need and you get the control you demand. It's bound to make them a lot happier, and you a lot happier too.

For more information on how a Solution Center can work for you, call toll free at 800-328-5111, extension 2724. In Minnesota, call collect 1-612-870-2142, extension 2724.

Another Big Idea From Honeywell Large Systems

Look to Honeywell Large Systems for solutions to information management problems and for products ranging from powerful computers to comprehensive networking capabilities.

Together, we can find the answers.

Honeywell

SYSTEMS & PERIPHERALS

Study says laser printers lead the pack in printer revolution

By Edward Warner
CW Staff

FRAMINGHAM, Mass. — The boom has yet to come for nonimpact printers, though steady growth is expected through 1987. Leading that boom will be laser-based page printers, according to a recent market research report.

International Data Corp. (IDC), based here, stated that while nonimpact printer technology has been around for some time, sales of nonimpact printers have "grown in fits."

The report predicted that the installed base of nonimpact printers will continue to double every two years, reaching 800,000 units by 1985 and 1.6 million units by 1987. The majority of those installations will involve serial printers, by roughly a three-to-one ratio, the report noted.

The report predicted total U.S. nonimpact printer shipments in 1984-85 to reach 421,300, more than double the 198,500 total from 1982-83. Growth predicted for 1984-85 in serial printers was pegged at 315,000 units shipped, roughly double the 1982-83 figure. Line and page printers were predicted to show tripled growth in 1984-85, with shipments of 68,300 and 38,000 units, respectively.

Most serial printer sales will be low-end machines (1 to 160 char./sec), while line printer sales will be strongest in the medium range (300 to 1,199 line/min.) and page printers will be strongest at the low-end (up to 20 page/min.)

A separate IDC memorandum on the page printer market pointed out that while "low-end page printers are just barely hitting the market, test models of low-speed page printers have been around for a couple of years now, and most reports are good."

The page printer memo predicted that technological developments could make 1985 "the year of the laser [page] printer," especially if a model in the $3,000 price range is developed. "Then, the laser printer would likely become the printer of choice for professional users overnight — provided the need or desire for color graphics does not suppress demand," the report said.

The memo blamed lagging sales of page printers on customer supposition that the machines were trouble-prone, costly and "perhaps above all, just a bit too early for

See PRINTER page 73

PERCENT OF TOTAL U.S. NONIMPACT PRINTER INSTALLED BASE COMPOSITION BY PRINTER TYPE, 1981-1987

			1981	1983	[illegible]	1987
SERIAL:	Low-end	1-160 cps	77.[illegible]%*	71.2%	[illegible]	66.4%
	Medium	161-320 cps	[illegible]	7.1	7.[illegible]	9.4
	High-end	321 cps & up	2.6	4.9	[illegible]	0.4
	TOTAL — SERIAL		[illegible]	83.2%	[illegible]	75.5%
LINE:	Low-end	Up to 299 lpm	[illegible]	1.4%	[illegible]	3.6%
	Medium	300-1199 lpm	[illegible]	8.6	[illegible]	6.7
	High-end	1200 lpm & up	[illegible]	2.0	[illegible]	2.4
	TOTAL — LINE		11.[illegible]%	12.0%	[illegible]	12.7%
PAGE:	Low-end	Up to 20 ppm	[illegible]	0.3%	[illegible]	7.8%
	Medium	21 ppm to 60 ppm	1.[illegible]	2.8	[illegible]	2.0
	High-end	61 ppm & up	[illegible]	1.7	[illegible]	0.9
	SUBTOTAL — PAGE		[illegible]	4.8%	7.[illegible]%	11.8%
TOTAL PRINTER INSTALLED BASE			[illegible]	100.0%	[illegible]	100.0%

*Percents shown may not add exactly due to rounding.

IDC CHART

Wang announces entry-level CPU for VS family

LOWELL, Mass. — Wang Laboratories, Inc. has announced the VS 15, an entry-level addition to its family of VS processors.

The VS 15 provides up to 1M byte of main memory. The unit supports up to 10 users and includes remote diagnostics features. The VS 15's cabinet can hold one or two 33M-byte disk drives or a single 76M-byte disk drive, the vendor said.

Eight preconfigured packages are available; however, users can purchase individual system components. A basic system priced at $13,500 consists of a CPU with 256K bytes of main memory, the operating system and a remote diagnostics facility; one internal 5.25-in., 33M-byte fixed disk drive; and a 5.25-in., 360K-byte diskette drive, the vendor said.

A spokesman said the VS 15 supports 16 I/O ports for workstations and peripherals. Four I/O ports are available for telecommunications.

As users add up to 10 workstations to their system, they can expand memory from 256K bytes to 512K bytes or 1M byte of main memory. Corresponding disk configurations are available, as is an optional cartridge tape drive or industry-standard, nine-track tape drive for backup.

With Wang Systems Networking transports, the VS 15 can tie into other remote Wang systems, including other VS series systems, Wang Office Information Systems, Alliance systems and Professional Computers, over dedicated or leased telephone lines. No special air conditioning or power lines are required for installation, the firm said.

The VS 15 can communicate with a host mainframe through a number of protocols. It supports IBM's 3271 Binary Synchronous Communications (BSC) and 3274 Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) information display systems emulation, 2780/3780 BSC for batch mode, 3777 SNA/SDLC for batch access to SNA networks, VS Hasp emulation and a teletypewriter mode for interactive asynchronous communica-

See WANG page 73

■ Optical Storage International, a joint venture by Control Data Corp and N.V. Philips, has announced an optical disk drive/70

■ Racal-Redac, Inc. unveiled a VAX-based system aimed at electronic enginnering applications/70

INSIDE

Trilogy's dream mainframe shattered by problems, high expenses

HARD TALK
Tom Henkel
CW Senior Editor

After months of technical problems and financial disappointments, Gene Amdahl's Trilogy, Ltd. has bowed out of the mainframe processor business. Instead, the company hopes to perfect, and sell, its wafer-scale integrated circuit packaging technique.

Saying Trilogy bowed out of the mainframe business is probably being too kind. The company never really made it into the business. There were promises of 1985 shipments of a 32 million instructions per second (Mips), IBM-compatible, fault-tolerant mainframe that would cost less than IBM mainframes offering half the performance. But multiple delays and technical problems turned that dream processor into a mirage.

The failure of Trilogy's mainframe project is not just a story of a startup company that fell short of its dreams. It is a testament to the dramatic changes that have taken place in the mainframe marketplace in the past 10 years.

When you think about it, a new technology, IBM-compatible mainframe from a startup company sounds too good to be true. But the legendary Gene Amdahl was making the promises, and that seemed to give the whole idea an air of credibility. After all, Gene Amdahl, while at the helm of Amdahl Corp., was able to give IBM a serious run for its money in the 370-compatible arena.

Back in 1970, Gene Amdahl started Amdahl Corp. with roughly $50 million. In 1981, when he formed Trilogy, Amdahl started off with $85 million in venture capital and managed to raise another $55 million through sales of limited partnerships. Another $77 million was raised by selling stock and license agreements to CII Honeywell Bull of France, Sperry Corp. and Digital Equipment Corp. But industry watchers contend that was not nearly enough. Some said Trilogy needed another $100 million to $200 million to get the mainframe project off the ground.

The costs involved in building and selling a high-powered mainframe are phenomenal. The R&D costs alone can make your head spin. But that is only the beginning. To compete with big names like IBM, the established plug-compatibles and the so-called pack of mainframe companies, a startup mainframe vendor has to establish a national sales force and maintenance network. It also must be able to advertise and keep pace on the trade show circuit with the big guys — two very costly endeavors.

Delivery delays caused by technical problems also forced Trilogy out of the mainframe business. When Gene Amdahl started talking about his new mainframe, he was comparing it to IBM's 3081. Now, the 3081 has been nearly forgotten in the flood of rumors about IBM's next big mainframe, the "Sierra," expected

See AMDAHL page 73

Laserdrive 1200 debuts

SANTA CLARA, Calif. — Optical Storage International, a joint venture between Control Data Corp. and Netherlands-based N.V. Philips, has unveiled its first optical disk drive, the Laserdrive 1200.

Designed for use mainly with medium-size systems, the drive will be available in the first quarter of 1985. Initially, the unit will be marketed only to OEMs, a CDC spokesman said.

The unit features a nonerasable storage capacity of 1G byte, a 150 msec access time and a sustained data transfer rate of 250K byte/sec, according to the CDC spokesman.

The drive comes in a cabinet which is 5¼ in. high, 19-in. wide and 25.6 in. deep. Information is recorded on a 12-in. glass disk. CDC said both the drive and recording disk have been under development for several years at laboratories in Colorado and the Netherlands.

Principal applications of the drive include on- or off-line access to large data bases of permanent information, such as those used in banking, insurance, petroleum, government and mining applications.

The Laserdrive 1200 costs $6,600 in quantities of roughly 200. The recording disks are priced at $265 each in OEM quantities.

More information is available from Optical Storage International at P.O. Box 58063, 3333 Scott Blvd., Santa Clara, Calif. 95052.

CIEE unveiled for engineers

WESTFORD, Mass. — Racal-Redac, Inc. has announced the Computer Integrated Electronic Engineering (CIEE) system for spanning and integrating a range of electronic engineering applications from engineering through design to production and testing.

The CIEE system is said to enable an engineer to create circuitry on a workstation and then simulate its performance before design commitment. The system is configured on a family of standard hardware. Digital Equipment Corp.'s VAX series 32-bit superminicomputers are used in conjunction with Racal-Redac's V-Series workstations for printed circuit-board design.

Racal-Redac's A-Series workstations are based on Apollo Computer, Inc.'s systems for engineering and silicon-design graphics applications. IBM Personal Computers provide data capture and engineering capabilities to complement the other workstations.

CIEE's relational data base enables data transfer between all workstations and software packages. The data base is also said to allow data transfer to existing office automation systems and other computer-aided design systems.

The price for the Series A workstation, including the circuit design package, is approximately $60,000, the vendor said. The product will be available in October. The price for the IBM Personal Computer circuit design and data capture software is $12,000 per package, the vendor said. The product will be available in September.

Racal-Redac is located at Lyberty Way, Westford, Mass. 01886.

PROCESSORS

DATACUBE, INC.
SP-123 Signal Processor

Datacube, Inc. has announced the SP-123 Signal Processor for its Digital Equipment Corp. A-bus and Intel Corp. Multibus high-resolution image acquisition board family.

The SP-123 is said to operate in conjunction with Datacube's VG-123 (Multibus) and QVG-123 (Q-bus) digital video frame stores to provide real-time image processing.

Image temporal and spatial filtering, image subtraction and other arithmetic functions reportedly are performed at 14.3 million pixel/sec.

One bit plane can be used to switch between two different processing algorithms, the vendor said.

The SP-123 is priced at $3,995.

Datacube, 4 Dearborn Road, Peabody, Mass. 01960.

DATA STORAGE

PYRAMID TECHNOLOGY CORP.
Disk drive; magnetic tape

Pyramid Technology Corp. has announced two products for its 90X superminicomputer, a 300M-byte removable disk drive and a tridensity magnetic tape.

The 90X supermini is a 32-bit, virtual memory processor that uses the firm's OSX operating system. Features include a dual-port version of two major implementations of the Unix operating system: System V from Bell Laboratories and the 4.2 BSD from the University of California at Berkeley.

The 300M-byte removable disk drive, Model 6100, is supplied in a free-standing, top-loading cabinet specifically designed for users who require removable data pack storage.

The tridensity magnetic tape, Model 6210, is available along with Pyramid's 1,600 bit/in. streaming tape. The 6210 tape is a 45 in./sec-start/stop drive with 6,250 bit/in. capability as one of three operator-selectable data densities.

SYSTEMS & PERIPHERALS

The 8210 is said to reduce to three the number of reels required to back up a 415M-byte disk.

The 300M-byte disk drive is priced at $35,000 (drive only), and the tridensity tape is priced at $31,500 (drive and cabinet), according to the vendor.

Pyramid Technology, 1295 Charleston Road, Mountain View, Calif. 94043.

DYLON DATA CORP.
Series 10 Magnetic Tape System

Dylon Data Corp. has announced the Series 10 Magnetic Tape System for users of the Hewlett-Packard Co. HP 1000 minicomputer. The tape system can be used on Models M, E or F of the HP 1000 and is said to increase overall system throughput, according to the vendor.

The Series 10 features dual-density 800/1,600 char./in. or tridensity 800/1,600 char./in. at 75 in./sec and 6,250 char./in. at 45 in./sec, the vendor said. It requires one slot in the processor chassis and is plug-compatible with the HP operating system and DVR23 drive, according to the vendor.

The Series 10 is priced at $17,390 for dual-density and $19,995 for tridensity group-code recording, the vendor said. The product is scheduled to be available Aug. 1.

Dylon Data, 9581 Ridgehaven Court, San Diego, Calif. 92123.

PRINTERS/ PLOTTERS

DATA GENERAL CORP.
Model 4535

Data General Corp. has introduced the Model 4535 dot matrix printer, which is reportedly a multifunctional unit with near letter-quality printing.

The Model 4535 is a 132-col. unit that can print from 50 to 200 char./sec. The unit incorporates self-testing capabilities and features a tractor feed and graphics support, according to a vendor spokesman.

An optional feature is an automatic sheet feeder (two sheets and one envelope bin), the vendor said. The cut-sheet feeder with multispeed and three-bin capabilities reportedly allows collation of complete mailing packages — letter, second page and envelope.

The Model 4535 is priced at $3,995 with tractor feed, and the automatic sheet-feed option is $1,500 for a two-bin and one-envelope-bin package, the vendor spokesman said.

Data General, 4400 Computer Drive, Westboro, Mass. 01581.

KENTEK INFORMATION SYSTEMS, INC.
K-2

Kentek Information Systems, Inc. has announced the K-2 intelligent copier/printer, said to offer high-resolution merged text and graphics printing with on-board intelligence.

The K-2 can accommodate applications including word processing, design, accounting and data processing. The copier is said to be able to merge multiple fonts, customized logos and signatures and business graphics.

Through use of electrophotographic technology, the K-2 is said to print letter-quality text and graphics from a variety of host microcomputers.

The K-2's print resolution is 240 by 240 pixel/sq in., the vendor said. Designed for high-volume printing, the K-2 is rated at 12,000 copy/mo. A variety of paper weights and sizes can be accommodated. Standard 8½- by 11-in. sheets are printed at the rate of 12/min, the vendor said.

Disks can store over 20 font type styles of 154 char. each, and up to 1,024K bytes of additional random-access memory is available.

The product is priced at $8,995 and is scheduled to be available in the fall, the vendor said.

Kentek Information Systems, Six Pearl Court, Allendale, N.J. 07401.

INNOVATIVE ELECTRONICS, INC.
Innovator 202-PC

Innovative Electronics, Inc. has announced an extended communications interface capability for its 300 line/min printer system. The Innovator 202-PC now is said to provide complete IBM 2780/3780 terminal emulation.

Features reportedly include space compression and

Continued on page 72

Continued from page 71

expansion, processor interrupt reception and conversational mode.

The printer costs $5,495.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

GRAPHICS SYSTEMS

PARAGON TECHNOLOGY CORP.
Model 42 Multitasker

Paragon Technology Corp. has announced the Model 42 Multitasker, a 32-bit, off-line autorouter/multitasking workstation, intended to be used as an additional node on Paragon's Series 300 Network System. The unit can also be used as an off-line workstation, compatible with Paragon's 100A and 200A printed-circuit board design graphics workstations.

Autorouting, design rule checking and data preparation functions operate concurrently with output tasks such as pen plotting, photo plotting, magnetic tape generation and report generation, according to the vendor.

The Model 42 consists of a console with a keyboard and a Digital Equipment Corp. VT100-type terminal. The CPU is a DEC LSI-11/73 running at 15 MHz. Memory capacity is 512K bytes, and the system includes three serial ports. The console accommodates an 8-in. floppy disk drive and a 20M-byte Winchester disk drive and controller, the vendor said.

The price of the Model 42 is $30,000, the vendor said.

Paragon Technology, 2199 Norse Drive, Pleasant Hill, Calif. 94523.

PERQ SYSTEMS CORP.
Linq; Accent; Perq AI

Perq Systems Corp. has announced a networkwide virtual memory operating system, an Ethernet-based local-area network and an artificial intelligence workstation.

The Ethernet-based Linq network is said to enable Perq graphics workstations to communicate with each other and to share access to peripheral devices and computer systems from various suppliers.

Linq reportedly incorporates the virtual memory operating system — Accent — a message-based system that reportedly can be ported to other vendors' computers. Accent was designed to let remote and local processors communicate by passing messages as though they resided on a local machine.

Perq AI is an artificial intelligence workstation designed to be linked into a distributed processing network. It consists of a Perq LN-3000 workstation with Accent and Common Lisp.

Perq AI costs $40,000, and Accent costs $1,000. They will be available in July.

Linq is incorporated into both products.

Perq Systems, 3600 Liberty Ave., Pittsburgh, Pa. 15230.

BOARD-LEVEL DEVICES

MATROX ELECTRONIC SYSTEMS LTD.
MSBC-QV3

Matrox Electronic Systems Ltd. has announced the MSBC-QV3 quad video controller, which reportedly puts four independent color or monochrome alphanumeric display generators on a single IEEE-P796, Intel Corp. Multibus-compatible printed-circuit board.

Each display can have a resolution of up to 24 lines of 80 char./line, the vendor said.

The MSBC-QV3 is targeted toward multiple-display applications, such as stock trading displays, airport displays, visitor information displays and process control consoles.

Each character can be assigned one of 128 foreground/background color combinations, according to the vendor.

An on-board hardware character generator is said to contain a 128 Ascii character set, including full uppercase and lowercase alphabet, punctuation, numbers zero through nine and 32 special graphics characters.

The MSBC-QV3 permits user interaction with each of the four displays via built-in keyboard interfaces, with each interface accepting tone-encoded data from a 16-key keyboard, the vendor said.

The MSBC-QV3 is priced at $1,620, according to the vendor.

Matrox Electronic Systems, 5800 Andover Ave., Montreal, Que., Canada H4T 1H4.

PARALLAX GRAPHICS, INC.
1000 series

Parallax Graphics, Inc. has announced the 1000 series of color graphics controller-board sets, featuring 88 million pixel/sec drawing speed and 1,024- by 1,024-pixel resolution.

The 1000 series offers a range of features, including 14 million pixel/sec block-image transfers and 1,024- by 768-pixel, 60Hz noninterlaced display or 1,024- by 1,024-pixel, 50Hz noninterlaced display.

On-board memory is expandable from 1,024 by 1,024 pixels to 2,048 by 2,048 pixels, and standard four-bit planes provide 256 colors from a 16-million-color palette, the vendor said.

The 1000 series controllers are targeted toward computer-aided design and manufacturing and animation applications that demand flicker-free images without jagged edges.

The Model 1000 Q-4 is a Digital Equipment Corp. Q-bus, large-scale integration, quad-size controller, including control board, memory data board, video display board, cabling and software primitives. The Model

1000 M-4 is an Intel Corp. Multibus version.

For OEM customers, the Multibus and Q-bus board sets are offered at $7,500 in quantity purchases, according to the vendor. The single-unit price for a three-board set is $10,000.

Parallax Graphics, 1005 E. Duane Ave., Sunnyvale, Calif. 94086.

AUXILIARY EQUIPMENT

GULTON INDUSTRIES, INC.
Microplot 80T Video Copier

The Graphic Instruments Division of Gulton Industries, Inc. has announced a thermal copying device designed to accept input from video monitors as well as from graphics and computer terminals.

The Microplot 80T Video Copier is said to utilize a video interface module and the company's Microplot 80T, an 8.5-in. wide printer/plotter. According to Gulton, the video copier accepts video outputs from most monitors and graphics and computer terminals. It is designed for applications where a maximum of two seconds screen freeze time is available.

Features are said to include a user-switch selectable choice of X- or Y-axis printing, designed to save print time and conserve paper; a reverse printing format to enhance printouts and reduce visual confusion and a repeat button that allows the user to reprint from the page buffer and eliminate the need for photocopiers.

It costs $2,095.

Gulton, Gulton Industrial Park, East Greenwich, R.I., 02818.

AMDAHL from page 69

to be announced either late this year or in the first quarter of 1985.

When it delayed delivery of its mainframe by 2½ years, Trilogy missed the best possible marketing window for the system. Even though Trilogy promised a beefed-up, 42- to 44-Mips dyadic processor in 1987, the system would not have been as impressive as a 32-Mips machine in 1985. And that delay surely caused some potential users to lose a little faith in Gene Amdahl's ability to give IBM another run for its money.

By deciding to market only the Trilogy wafer technology, Gene Amdahl has taken his only available option. Assuming Trilogy can iron out the problems in that technology, the move may — in the long run — prove to be a good choice.

WANG from page 69

tions.

The VS 15 uses Wang's VS operating system, which supports interactive and batch data processing, interactive program development, graphics, word processing, office information management and image processing.

The VS 15 supports Wang Office, a software product that provides an integrated set of network-based applications for Wang systems; Wang Systems Networking products for linking Wang systems and providing gateways to other vendors' products; Wang WP Plus and VS/Integrated Information System word processing; and VS Multistation windowing and graphics facilities, the vendor said.

For data processing users, the VS 15 provides data management systems and programmer productivity tools, such as VS DMS/TX, Enquery and VS/Report. The VS 15 supports RPG-II, Cobol, PL/I, Fortran 77 and Basic. Data security can be implemented at the user, file, program or workstation level.

Wang is located at One Industrial Ave., Lowell, Mass. 01851.

PRINTER from page 69

the market — full office automation is not yet a reality."

The memo admitted that reliability problems do exist, especially among the low-volume units, and urged vendors "to step up their educational processes when installing these printers lest the public become contaminated with even more horror stories."

The nonimpact printers report, meanwhile, predicted that among nonimpact serial printers the leading technology will remain direct thermal, at least through 1987, the farthest point of the report's projection. Thermal transfer and thermal ink-jet serial printers, just becoming available in the U.S., will command 4.1% and 3.3%, respectively, of the installed base of serial printers by 1986, the report estimated.

"Ink-jet [serial] printers are the ones everybody is now selling, or introducing or developing — but sales just do not warrant the amount of fuss they are receiving in the trade [magazines] and in some boardrooms," the report said. Ink-jet technology for serial printers, the report continued, may become a potent force in the low-scale color graphics market, but "will never become the word processing 'dream printer' that many once thought." However, ink-jet line printers "seem destined to disappear," the report added.

The nonimpact printers report also was cool to the market for thermal transfer serial printers, saying, "The market will probably arrive, but not at the speed or with the success that so many analysts have predicted and for which so many manufacturers have hoped."

At its low end, the direct thermal printer market will get a boost, the report said, by IBM's introduction of a printer based on that technology for the IBM PCjr. That printer, it continued, will speed price erosion in that market, one currently dominated by low-cost, Japanese dot-matrix printers, and give "the Big Blue imprimatur" to such products.

IDC is located at 5 Speen St., Framingham, Mass. 01701.


Resourceful
INFODATA
The Resourceful Software Technology Company

MICROCOMPUTERS

SMALL TALK
Paul Korzeniowski
CW Staff Writer

Market research — trustworthy?

How many spreadsheets were sold last year? Where is the microcomputer market headed? Who are the viable manufacturers? How many companies are downloading data from a mainframe to a personal computer?

Microcomputer managers, bombarded with a perplexing array of issues and concerns, are willing to spend a great deal of money for answers to questions like these. Market information, *reliable* information, has become one of the most important and rarest by-products of the microcomputer revolution.

Dozens of market research and consulting firms are attempting to capitalize on this growing thirst for information. Newsletters, surveys and reports are multiplying as rapidly as integrated software packages and IBM Personal Computer-compatible microcomputers.

But many market research firms simply masquerade opinions as facts, a practice not limited to microcomputer market research. One *Computerworld* reporter recently called an author of a report filled with charts and percentages illustrating the increase in demand for Ada programmers. Asked where these statistics came from, the author replied, "[They were] just a feeling I had for where the market was going."

This practice is commonplace in micro market studies. Another author revealed that his survey was based on a number of interviews he completed while wandering among the exhibits at last fall's National Software Show.

While selling other people's perceptions as facts is not as brazen as selling your own beliefs as gospel, both practices may represent a major headache to someone basing decisions on seemingly reliable statistics.

Before relying on market statistics, managers should realize that market research is a difficult, expensive and time-consuming task. Few companies are willing to do it.

Even at best, market research is not an exact science; it largely produces estimates rather than actual numbers. "No one really knows how many personal computers were bought last year," said Robert Fertig, president of Enterprise Information Systems, Inc.

No company has the resources or the patience to track every microcomputer manufactured, so market research firms poll computer stores, data processing departments and distributors. In return for supplying needed information, these sources are compensated with a gold pen or a copy of the report — not a foolproof method of sampling.

Other problems arise because the path from a manufacturer to an end user is riddled with detours, and bookkeeping magic can disguise slow-selling products. Products gathering dust in a distributor's warehouse or a computer store's back room may be marked down as sold to end users.

See RESEARCH page 82

Uniform's Connector to run Unix and PC-DOS concurrently

By Paul Korzeniowski
CW Staff

SANTA BARBARA, Calif. — Uniform Software Systems, Inc. has announced an operating system utility said to allow an IBM Personal Computer XT running IBM's PC-IX operating system to run Unix and IBM PC-DOS applications concurrently.

The Connector reportedly allows the user to load (not emulate) PC-DOS, run it as a subset of PC-IX and execute a PC-DOS application.

PC-IX, a multitasking Unix System 3-compatible system, "had Unix and PC-DOS read and transfer file capabilities implanted," commented Peter Marvit, senior analyst at Yates Ventures, Inc., a Los Altos, Calif., market research firm. "The Connector is the first product which takes those pieces, integrates them with other features and allows the user to run both PC-DOS and Unix."

PC-IX multitasking capabilities allow a user to process concurrently one or more Unix applications in background and one PC-DOS application in foreground.

"The number of applications a user can load (depends) on his hardware configuration and software requirements," Uniform founder Peter Weiner maintained. "PC-IX uses dynamic multitasking, which takes as much memory as it needs. I would think he could easily run five to 10 applications."

Users reportedly can switch from Unix to PC-DOS or vice versa by typing a one-word command. PC-IX is equipped with a file transfer feature said to allow two-way translation of PC-DOS files to Unix format.

Since its introduction in January, some analysts have questioned the viability of PC-IX. "There is a market for PC-IX," said Michael Dubrall, managing analyst at Yates. "I don't think it is a large market like the general office automation market, but a smaller market like the program development market."

Uniform hopes to transform the program development market into a general-

See CONNECT page 82

DG enhances Desktop micro line

By Paul Korzeniowski
CW Staff

WESTBORO, Mass. — Positioning itself in the supermicrocomputer arena, Data General Corp. enhanced its Desktop Generation microcomputer line so that two models now support eight users, two models support 16 users and all can incorporate a 38.6M-byte hard disk drive and use a variety of high-speed printers.

The Desktop Generation line consists of four models — the Model 10, Model 10 SP, Model 20 and Model 30 — each of which previously handled one to four users. Eight users are now supported on the Model 10 and Model 10 SP, while the Model 20 and Model 30 now support 16 users. In conjunction with the increased number of users, Data General introduced a four-terminal multiplexer priced at $1,050.

A Model 10 sells for $3,165 and comprises DG's Microeclipse and Intel Corp.'s 8086 microprocessors, 128K bytes of random-access memory (RAM), 368K bytes of diskette storage and a monochrome monitor. The Model 10 SP, offered for $3,565, reportedly adds a floating-point processor. Both microcomputers have been enhanced to provide a maximum of 1.75M bytes of RAM rather than the previous maximum of 768K bytes.

DG said that the Model 20, priced at $9,815, features 256K bytes of RAM, a 15M-byte hard disk, a 368K-byte disk drive and monochrome monitor. The Model 30, selling for $11,815, is said to add a character instruction set and hardware floating-point card to the Model 20 configuration.

The systems can run DG's Rdos and Ados multiuser operating systems as well as Microsoft, Inc.'s MS-DOS and Digital Research, Inc.'s CP/M 86 single-user operating systems.

Lotus Development Corp. announced plans to provide a Desktop Generation version of Symphony, its integrated program scheduled for shipment in early July.

DG also unveiled a number of microcomputer peripheral products:

- Increased storage capacity with a maximum of 77.2M bytes housed in two 38.6M-byte hard disks, which cost $5,745 each.
- A 132-col. dot matrix printer, priced

See DG page 82

SQL/DS-compatible DBMS debuts

CHESTNUT HILL, Mass. — A microcomputer data base management system said to be compatible with the IBM Structured Query Language (SQL)/Data System and Database 2 mainframe software systems was announced here by Database Systems Corp.

Database's Qint/SQL reportedly allows corporations to integrate individualized data processing on microcomputers with their centralized data bases. "No longer will DP departments have to waste time or money answering repetitive questions that do not form part of their primary areas of responsibilities," claimed Database President Stefaan De Schrijver. "Individual users can now do this on their own using Qint/SQL."

Three versions of Qint/SQL are available: Query, Query and Update and Administrator. Query was designed for users who only need to retrieve data from the data base, Query and Update for those who need to enter and retrieve data and Administrator for those who create, maintain and manage data base systems, the vendor said.

Query is priced at $1,000, Query and Update at $1,350 and Administrator at $2,400. Additional information is available from Database Systems, 50 Waban Hill Road N., Chestnut Hill, Mass. 02167.

SOFTWARE

GOLDATA COMPUTER SERVICES, INC.
Goldatabase enhancements

Goldata Computer Services, Inc. has enhanced Goldatabase, a data base management system designed for the IBM Personal Computer using IBM's PC-DOS operating system.

The enhancements include procedure and command file capabilities, global change to a selection set, password security and modificaton of multiple fields within a record.

Other changes reportedly include expanded print capabilities, an easier-to-use data base edit format, new print report capabilities and expanded design features.

Goldatabase requires 192K bytes of random-access memory and costs $350.

Goldata Computer Services, 2 Bryn Mawr Ave., Bryn Mawr, Pa. 19010.

COMMUNICATIONS PROFESSIONALS, INC.
Dlock

Communications Professionals, Inc. has introduced Dlock, a machine language extension to Ashton-Tate's Dbase II data base management system.

Dlock, a locking extension for Dbase II, reportedly provides file-level locking in a multiuser environment. Its routine resides in high memory and can be accessed directly from Dbase command files through the CALL statement, allowing an unlimited number of users to gain shared access to common files while preventing collisions, according to the vendor.

Dlock is available on 8-in. Digital Research, Inc.'s CP/M or 5¼-in. Televideo Systems, Inc. diskettes and operates under Digital Research's MP/M, Musys Corp.'s Turbodos, Televideo Systems, Inc.'s Mmmost and OSM Corp.'s Muse operating systems. It is said to be adaptable to other CP/M-compatible, multiuser operating systems as well.

Dlock is priced at $150.

Communications Professionals, Suite 1-238, 701 E. Bay St., Charleston, S.C. 29403.

SENSOR-BASED SYSTEMS, INC.
Metafile network version

Sensor-Based Systems, Inc. has introduced a networking version of its Metafile software, which is said to support most local-area network offerings for the IBM Personal Computer and the Personal Computer XT.

A new Metafile multiuser option allows multiple users to share system resources, Sensor-Based Systems said. Using Metafile, data base information reportedly can be shared by concurrent users with transaction level locking, a feature that enables multiple users to share files while protecting data integrity.

Metafile users reportedly can operate other software without leaving Metafile's integrated environment, and application developers can write their own Metafile system extension programs and integrate them directly into the Metafile language. Other enhancements are said to permit users to control disk resource allocation.

Metafile is priced at $995.

Sensor-Based Systems, 401 16th St. S.E., Rochester, Minn. 55904.

AUTOMATED IMAGES, INC.
Wildcard

Automated Images, Inc. has introduced a graphics editing system that reportedly allows users to create and edit two-dimensional drawing files on an IBM Personal Computer or compatible models.

Called Wildcard, the system is said to support color display and to allow users to review and edit printed wiring board data and other files. The system includes a stylus and digitizing tablet for data entry and drawing manipulation.

Wildcard reportedly can be directly interfaced with Applicon, Inc.'s 870 Graphic System and will allow present Applicon 870 users to edit their existing drawing files with IBM hardware.

Wildcard runs on systems under Microsoft, Inc.'s MS-DOS and features memory-coresident drawing file and system commands for virtually instant response, according to the vendor.

Wildcard is priced at $8,000.

Automated Images, 53 Cummings Park, Woburn, Mass. 01801.

JMI SOFTWARE CONSULTANTS, INC.
C cross compiler

JMI Software Consultants, Inc. has announced a C cross-compiler that moves C programs from systems using National Semiconductor Corp.'s (NSC) Series 32000 microprocessors to the IBM Personal Computer.

The product is comprised of code generators for Intel Corp.'s 8088, 8086 and 80186 and NSC's 32008, 32016 and 32032 microprocessors. The package includes a cross-assembler that reportedly produces assembly listings, including addresses, object code and assembler source code. A cross-linker facilitates the construction of random-access memory and read-only memory systems, JMI said. Floating-point support is provided in conjunction with the NSC 32081 floating-point unit.

The cross-compiler costs $1,500.

JMI Software Consultants, 1432 Easton Road, Roslyn, Pa. 19001.

INTERNATIONAL MICROCOMPUTER SOFTWARE, INC.
Datasafe

International Microcomputer Software, Inc. (Imsi) has announced Datasafe, a microcomputer encryption system.

Datasafe utilizes Data Encryption Standard, developed by IBM 15 years

Continued on page 77

Continued from page 76

ago, to protect data transferred by modem between any microcomputer, minicomputer or mainframe, Imai said.

The product runs on microcomputers using Digital Research, Inc.'s CP/M and CP/M 86 or Microsoft, Inc.'s MS-DOS operating system.

Datasafe costs $135.

International Microcomputer Software, 633 Fifth Ave., San Rafael, Calif. 94901.

DATA I/O CORP.
Promlink

Data I/O Corp. has introduced Promlink, a utility which simplifies programmer menus on an IBM Personal Computer with IBM's PC-DOS operating system.

Promlink reportedly stores operating parameters on a disk, allowing users to redefine default values or eliminate resetting values each time Promlink is run, Data I/O said. The product allows the user to recall several program menus to a terminal by keying in one-digit or two-digit commands, according to the vendor.

Promlink costs $295.

Data I/O, P.O. Box 97046, 10525 Willows Road N.E., Redmond, Wash. 98073.

AMERICAN COMPUSOFT CO.
Flirt

American Compusoft Co. has introduced Flirt, a utility that evaluates and corrects data files.

The program reportedly will examine a file for consistent fields and field lengths and correct any aberrant records, American Compusoft said. Flirt is said to allow users to edit or create files and add records to a file.

The program works with any microcomputer using Digital Research, Inc.'s CP/M or CP/M 86, Microsoft, Inc.'s MS-DOS or IBM's PC-DOS operating system.

Flirt sells for $295.

American Compusoft, 23113 Plaza Point Drive, Laguna Hills, Calif. 92653.

FOX & GELLER, INC.
R:Graph

Fox & Geller, Inc. have released R:Graph, a graphics extension for Microrim, Inc.'s R:Base data base management program designed for the IBM Personal Computer XT using IBM's PC-DOS operating system.

The software reportedly allows users to chart any relation between fields in a single graph, produce on-screen color graphics and create multiple color charts on a single printout. R:Graph goes into R:Base so that users can view data that they wish to select and present, Fox & Geller said.

The program costs $295.

Fox & Geller, 604 Market St., Elmwood Park, N.J. 07470.

BITWARE COMPUTER APPLICATIONS
CMRS

Bitware Computer Applications has announced Computerized Medical Records System (CMRS), a medical, laboratory and research package that runs on an Altos Computer Systems, Inc. Altos 580 microcomputer using Digital Research, Inc.'s MP/M operating system.

CMRS, an interactive package, reportedly supplies information for in-progress and completed cases. The menu-driven package allows a user to enter information with the CMRS data dictionary or supplemental screens, Bitware said. The program allows the user to link records and construct files with unlimited records and fields, according to the vendor.

CMRS, written in Fortran, costs $7,500.

Bitware Computer Applications, 2217 Cascade Place, Davis, Calif. 95616.

JMI SOFTWARE CONSULTANTS, INC.
Bastoc enhancement

JMI Software Consultants, Inc. has enhanced Bastoc, a software tool that translates Basic programs to formatted C source code.

The enhanced package reportedly will add Cbasic compiler dialect support to existing support of Microsoft, Inc.'s Basic. Bastoc reportedly can serve as a conventional Basic compiler when configured as a preprocessor to a C compiler. Bastoc may be tailored by the end user who can add new Basic statements and functions, JMI said.

Bastoc is available for a number of computers, including the IBM Personal Com-

Continued on page 78

Continued from page 77

puter, Wang Laboratories, Inc. Professional Computer, Radio Shack's Model 16 and Apple Computer, Inc.'s Lisa.

Bastoc costs $350.

JMI Software Consultants, 1422 Easton Road, Roslyn, Pa. 19001.

SOLUTION SYSTEMS
C Helper

Solution Systems has introduced C Helper, a utility program for C language programmers.

C Helper compares two files, follows insertions and illustrates differences, Solution System said. The program is said to include a cross-reference feature and a search capability for complex file patterns. The product produces a flowchart that shows how a program works as subroutines are called, the vendor said.

The package runs under IBM's PC-DOS; Microsoft, Inc.'s MS-DOS; Apple Computer, Inc.'s Apple-DOS; and Digital Research, Inc.'s CP/M and CP/M 86 operating systems.

C Helper costs $135.

Solution Systems, 45 Accord Park Drive, Norwell, Mass. 02061.

ROLODEX CORP.
Compucard

Rolodex Corp. has announced Compucard, an automated Rolodex card software system for the IBM Personal Computer and Apple Computer, Inc.'s Apple IIe.

Compucard, a menu-driven program, reportedly allows users to create, update and duplicate Rolodex card systems in various quantities, formats, sizes and print modes.

The program features rapid printing of any number of card sets, the creation of a master card file through a template function, a full screen editor, dual-indexing system and a select system that enables the user to develop and control various filing methods, Rolodex said.

Compucard costs $49.95; for $68.50, the user receives a Rolodex file as well as Compucard.

Rolodex, 245 Secaucus Road, Secaucus, N.J. 07094.

SYSTEMS

C&W NORTH AMERICA
C&W Model 10

C&W North America has announced the C&W Model 10 microcomputer.

The C&W Model 10 features three communication ports, 128K bytes of random-access memory, two 5¼-in. disk drives, a printer port and Digital Research, Inc.'s CP/M operating system, C&W North America said.

The system reportedly is equipped with either a Bell Laboratories' 103 or 212 series modem and a text editor that features automatic word wrap, paragraph formatting, text insert and delete and screen scroll.

C&W Model 10 sells for $1,795.

C&W North America, Suite 4700A, 1601 Elm St., Dallas, Texas 75201.

CHASE DECISION SYSTEMS
Horizon/370

Chase Decision Systems has announced the Horizon/370 turnkey forecasting system, which combines statistical, modeling and forecasting software with the IBM Personal Computer XT/370.

According to a spokesman, Horizon/370 utilizes an optimized version of the Personal Computer XT/370, featuring increased hard disk storage and faster response time. It is said to facilitate forecasting techniques such as regression analysis, including nonlinear, two-stage and pooled regression and time-series analysis.

Software provided with the system includes Chase Decision's proprietary applications packages, Lotus Development Corp.'s 1-2-3 package and IBM's PC-DOS 2.0 operating system.

Through Horizon/370, a user reportedly can access data from a mainframe as well as economic data from Chase Econometrics and other third-party data sources. The system can be used to estimate, evaluate and validate statistical models, develop forecasts, create reports and graphs and create routines to automate repetitive forecasting tasks, Chase said.

Horizon/370 is scheduled to be available in July and has a total package price of $50,000.

Chase Decision Systems, 1000 Massachusetts Ave., Cambridge, Mass. 02138.

MONROE SYSTEMS FOR BUSINESS
MS 2000 Multi-User System

Monroe Systems for Business has introduced a multiuser version of its MS 2000 microcomputer, a system based on the Intel Corp. 80186 16-bit microprocessor chip.

The MS 2000 Multi-User System uses the Concurrent CP/M 86 operating system from Digital Research, Inc., which reportedly permits multiple users to operate a single application and share files or work from the separate data files of individual applications, such as spreadsheets.

The system is said to provide file locking, print utility, record locking, password protection, virtual consoles and multiple-user data bases.

Existing single-user MS 2000 installations reportedly can be upgraded to multiuser configurations. The MS 2000 console acts as a user workstation from which up to four different jobs may be run concurrently.

The MS 2000 Multi-User System is priced between $11,995 and $31,995.

Monroe Systems for Business, The American Road, Morris Plains, N.J. 07950.

See SYSTEMS page 79

SYSTEMS from page 78

PERTEC COMPUTER CORP.
Model 3215 enhancements

Pertec Computer Corp. has announced the enhanced Model 3215 desktop system, a member of Pertec's Motorola, Inc. MC68000-based System 3200 family of business computers, now available with up to two 53M-byte Winchester hard disk drives and a streaming cartridge tape drive.

The Model 3215, which supports up to 11 users, also can be fitted with a desktop 26M-byte or 53M-byte 5¼-in. add-on expansion unit and an add-on streaming cartridge tape drive unit. Model 3215 internal memory is said to be expandable from 256K bytes to over 1M byte.

Model 3215 measures 11-in. wide, 20-in. deep and 6¼-in. high. The unit retails for between $6,900 and $10,000, depending on capacity, the vendor said.

The desktop streaming cartridge tape drive is said to be able to back up 21M bytes in less than 30 minutes. The drive is priced at $3,000.

Pertec Computer, 17112 Armstrong Ave., Irvine, Calif. 92713.

COMMUNICATIONS

DATASTREAM COMMUNICATIONS, INC.
Execulink 3270

Datastream Communications, Inc. has introduced its Execulink 3270 software, which reportedly allows the IBM Personal Computer to emulate an IBM 3278 terminal, performing bidirectional text file transfer with a host.

Execulink 3270 is said to provide network integration for IBM Personal Computers by allowing them to transfer files to and from the host to a Personal Computer disk storage unit or attached printer, the latter via IBM 3278 emulation.

When used with Datastream's 874 Systems Network Architecture controllers, the product reportedly allows Personal Computer users to transform their machines into 3270 communicating workstations. The product also is said to permit all IBM 3270 printer functions to be performed over a single line at remote locations and eliminates the need for multiterminal workstations. Switching is available, in the IBM 3270 mode, from display to printer functions, the vendor said.

Execulink 3270 is priced at $195.

Datastream Communications, 1115 Space Park Drive, Santa Clara, Calif. 95050.

LOGICAL BUSINESS MACHINES, INC.
L-Net

Logical Business Machines, Inc. has announced a new local-area network called L-Net.

The MS-DOS-based local-area network reportedly extends the company's Diplomat natural language for multiuser use with record- and file-level locking capability. The network allows users to link as many as 64 microcomputers, sharing data files and application programs and pooling peripherals, Logical said.

The Diplomat language was designed for use on Logical's L-XT microcomputer, the IBM Personal Computer and Personal Computer XT and other IBM-compatible microcomputers. The language uses English words to create data files, entry screens and reports with less programming logic than required by conventional languages, the vendor said.

L-Net is a linear-bus network connected with twisted-pair cable of up to 10,000 feet. The network uses an Ethernet-like CSMA/CD protocol, with a data transmission rate of 2.5M bit/sec.

File server kits for converting hard disk computers for L-Net are priced at $1,890. The hardware and software required to convert a standalone microcomputer into a workstation sell at between $775 and $1,200, depending on configuration. Network repeaters for each 600-ft extension of the data bus are priced at $615 each.

Logical Business Machines, 1294 Hammerwood Ave., Sunnyvale, Calif. 94086.

STERLING SOFTWARE MARKETING, INC.
PC-Trace

Sterling Software Marketing, Inc. has introduced an enhanced version of its telecommunications package that reportedly enables IBM Personal Computers to transfer data to any computer that can send or receive data in a bisynchronous mode.

PC-Trace is said to include the following enhancements: transparency mode transmissions and turn-line, wait-time and next-file functions.

The transparency mode features reportedly allow users to transfer virtually any data. The enhanced version also offers the capability to transmit and receive job streams, executable versions of programs and internal files from programs such as Lotus Development Corp.'s 1-2-3 program.

The package is priced at $950.

Sterling Software Marketing, 1007 Seventh St., Sacramento, Calif. 95814.

AVATAR TECHNOLOGIES, INC.
PA1000E

Avatar Technologies, Inc. has announced a protocol converter that reportedly enables any microcomputer or Ascii terminal to access both IBM mainframe environments and Ascii hosts either locally or remotely.

The PA1000E features read-only

Continued on page 80

MICROCOMPUTERS

Continued from page 79

memory-based Help screens for some popular microcomputers, including the IBM Personal Computer running IBM 3101 terminal emulation software, the Digital Equipment Corp. Rainbow running VT100 emulation software and Apple Computer, Inc.'s Macintosh running Macterm software, a vendor spokesman said.

The PA1000E reportedly connects via coaxial cable to an IBM 3274/76 cluster controller supporting IBM Binary Synchronous Communication or Systems Network Architecture/Synchronous Data Link Control environments and through an auxiliary RS-232C port to any Ascii device, including a printer or modem for connection to an asynchronous host, public information or time-sharing service.

The unit sells for $1,095.

Avatar Technologies, 99 South St., Hopkinton, Mass. 01748.

COMPUPRO CORP.
Net 10

Compupro Corp. has introduced a network option for the Compupro 10 multiuser microcomputer, which is said to allow up to 16 users on four nodes to be networked together for less than $100 per user.

The Net 10 network option uses Datapoint Corp.'s Arcnet protocol and requires a passive hub and RG62 coaxial cable to network four Compupro 10 four-user systems, the vendor said. The option is said to allow up to 225 nodes, or 1,020 users, to be connected over distances of up to four miles.

Microcomputers that support the Arcnet protocol, including IBM, Compaq Computer Corp. and Texas Instruments, Inc. products, also can operate on the network, the vendor said.

Net 10 features 2.5M bit/sec transmission speed using direct-memory access, as well as a number of security features, according to the vendor.

The price for the Net 10 option is $395 for each four-user node, the vendor said. The product is scheduled for third-quarter shipment.

Compupro, 3506 Breakwater Court, Hayward, Calif. 94545.

PATHWAY DESIGN, INC.
SNA/3270; SNA/3770 enhancements

Pathway Design, Inc. has announced enhancements to its microcomputer-to-mainframe communications programs that are said to increase the functionality of micros such as the IBM Personal Computer and Wang Laboratories, Inc. Professional personal computer.

The enhancements to Pathway's Systems Network Architecture/3270 (SNA/3270) and SNA/3770 products include user exits and data redirection, which enable users to execute IBM DOS facilities and Personal Computer applications during micro-to-host communications as well as direct data to the disk in a 3270 interactive mode, the vendor said.

The programs are priced at $595.

Pathway Designs, 177 Worcester St., Wellesley, Mass. 02181.

FOX RESEARCH, INC.
10-Net

Fox Research, Inc. has introduced a kit of hardware, software and utilities that link IBM Personal Computers and compatible systems in a 1M byte/sec local-area network.

The Fox 10-Net network reportedly allows users to share such resources as applications, files, on-line storage devices and peripherals. 10-Net requires no central file server and works over ordinary twisted-pair wiring, Fox said. It provides record locking at the network level to allow multiple users to access the same file simultaneously with no danger of collisions at the record level, according to the vendor.

Fox 10-Net also is said to provide multiple levels of password security and network-lockout security options to maintain file integrity and control for individual users.

10-Net is priced at $695 per user.

Fox Research, 7005 Corporate Way, Dayton, Ohio 45459.

ANDERSON JACOBSON, INC.
AJ Connection

Anderson Jacobson, Inc. has introduced a plug-in modem, the AJ Connection, for the IBM Personal Computer and Personal Computer XT and compatible machines.

MICROCOMPUTERS

The AJ Connection is reportedly compatible with the Hayes Microcomputer Products, Inc. Smartcom and other major communications software programs. The modem allows simultaneous printing and communications through use of two I/O ports, Anderson Jacobson said.

AJ Connection also is said to feature a speaker to monitor calls in process, serial and modem port configurations and a built-in asynchronous communications adapter.

The AJ Connection is priced at $495.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131.

STORAGE

AMLYN CORP.
Model 1865

Amlyn Corp. has announced a 5¼-in. floppy disk drive that is said to be capable of storing 3.2M bytes of data on a single diskette.

The Model 1865 records at 10,250 bit/in. and 170 track/in. On each side of an industry-standard UHR-II high-coercivity 5¼-in. flexible diskette, the Model 1865 places 154 tracks. Track-to-track access time is said to be less than two milliseconds.

The drive is functionally equivalent to two 8-in. double-sided, double-density drives or two 1.6M-byte, 96 track/in. drives, according to the vendor.

The drive normally spins a 170 track/in. diskette at 360 revolutions per minute to achieve a data transfer rate of 500K bit/sec, the vendor said.

Production volume shipments are expected to be available in the fourth quarter.

The unit price for the Model 1865 is $330 in 1,000-unit quantities, the vendor said.

Amlyn, 2450 Autumnvale Drive, San Jose, Calif. 95131.

COMPUTER PRODUCTS INTERNATIONAL, INC.
Universal mass storage system

Computer Products International, Inc. has announced a universal mass storage system, with capacities ranging from 8M bytes to 368M bytes, for use in networks with more than 30 different computer systems.

The Winchester disk drive is designed for use in a Corvus Systems, Inc. Omninet local-area network or with up to 16 microcomputers from IBM, Digital Equipment Corp., Apple Computer, Inc. and other manufacturers, through full multiplexing capabilities.

It is said to feature a 7.5M bit/sec data transfer rate, a 16K-byte data buffer and an optional 32M-byte removable tape cartridge for backup.

Prices range from $1,995 for the 8M-byte system to $6,700 for the 368M-byte system.

Computer Products International, 2025 Gateway Place, San Jose, Calif. 95110.

DRAGON INDUSTRIES
Models SPF, SFT

Dragon Industries has introduced a series of backup systems for its line of Super Performance 65M-byte and 140M-byte hard disk drives.

The Dragon 3.3M-byte Model SPF backup disk drive reportedly stores eight times the capacity of double-sided, double-density 5¼-in. diskettes. It features a 500K bit/sec transfer rate. The Model SPF is optional with the firm's IBM-compatible 65M-byte and 140M-byte hard disk drive sytems, Dragon said.

The Dragon Model SPF reportedly can read 48 or 96 track/in. diskettes. The Model SPF is said to be compatible with IBM's PC-DOS and Microsoft, Inc.'s MS-DOS and is priced at $995.

A 60M-byte ¼-in. streamer tape backup, Model SFT, is also available. The ¼-in. streamer tape model is priced at $1,995.

Dragon Industries, 35 Main St., Hopkinton, Mass. 01748.

HOLMES ENGINEERING, INC.
Bullet

Holmes Engineering, Inc. has introduced Bullet, a mass storage device for notebook-size microcomputers.

Bullet plugs into an RS-232 serial port, features menu-driven commands and is powered by its rechargeable battery or a power transformer, Holmes said. The product reportedly fits into a briefcase with a notebook microcomputer and stores 64K bytes of data on tape cassettes.

The device is designed for

Continued on page 82

MICROCOMPUTERS

Continued from page 81

the Radio Shack TRS-80 Model 100, Olivetti, Inc.'s M-10 and NEC Home Electronics, Inc.'s 8021 microcomputers.

Bullet costs $369.95, according to the vendor.

Holmes Engineering, 5175 Green Pine Drive, Salt Lake City, Utah 84107.

PRINTERS/PLOTTERS/PERIPHERALS

SHARP ELECTRONICS CORP. 12M-15BU; 12M-22U; 13M-31U

Sharp Electronics Corp. has introduced three terminals for personal computers: the 12M-15BU, 12M-22U and 13M-31U.

The 12M-15BU reportedly is a 12-in. green-on-black monitor that can display 2,000 characters on a nonglare screen. An amber-on-black model is also available.

The 12M-22U is billed as a 12-in. color monitor that features a .38-phosphor dot pitch and a 16-color display. This product reportedly has a horizontal resolution of 560 dots and a display format of 2,000 characters in an 80-char. by 25-line format.

Sharp's 13M-31U, a 13-in. CRT, features controls mounted on a front panel for easy access, allows for audio input and has a horizontal resolution of 280 lines, Sharp said.

The 12M-15BU costs $199, the 12M-22U sells for $549 and the 13M-31U's price is $399.

Sharp Electronics, Systems Division, 10 Sharp Plaza, Paramus, N.J. 07652.

BOARD-LEVEL DEVICES

TAURUS COMPUTER PRODUCTS, INC. Taurus Board

Taurus Computer Products, Inc. has introduced Taurus Board, a single-board data acquisition and control system for the IBM Personal Computer.

Taurus Board combines an I/O board, termination panel and T-Soft101, a software package that provides programming tools to control the hardware and includes input, output and counting functions that can be executed in Basic, Taurus said. Up to 38 I/O signals reportedly can be accommodated by the board.

Taurus Board comes in two configurations. KS101, priced at $1,195, handles 16 analog input channels and 16 digital I/O points. KS102, priced at $1,857, adds two analog output channels and four event counters to the basic KS101 configuration, according to the vendor.

Taurus Computer Products, 340 Commercial St., Manchester, N.H. 03101.

RESEARCH from page 75

Tracking who buys the machine and how it is used is impossible. "Computer store owners have no way of knowing whether a microcomputer will be placed in a home or corporation," said Harold Kinne, senior vice-president at Future Computing, Inc. Corporations often don't know how many they buy because purchases are buried in department budgets.

Consequently, even reputable market research firms' findings differ greatly.

So what can microcomputer managers needing reliable statistics do? They can be as selective choosing market research data as they are in approving software products. They can limit their choices to one or two reputable firms whose sampling methods remain consistent over time.

While these firms' estimates may not be completely accurate, they can supply a foundation on which managers can build when important purchasing and planning decisions confront them.

CONNECT from page 75

purpose market. "No one will have to wait for PC-DOS products to be rewritten under Unix," Uniform President Peter Wensburg said. "There is no impediment to upgrading a Personal Computer to take advantage of the undeniable advantages of Unix."

Marvit agreed with Wensburg's scenario. "There are a number of useful end-user applications written for Unix," Marvit said. "There are two problems with these products. They lack a clear distribution path, so buyers can't locate the packages; and despite Unix claims of portability, these packages have to be ported to different machines."

Few packages now run under PC-IX, which was first shipped last month, Marvit noted. "There are maybe 10 packages that run on PC-IX, but I think that will soon change," Marvit said.

The Connector will be available in September at less than $300, Uniform said.

Uniform Software Systems is located at 1110 Eugenia Place, Carpinteria, Calif. 93013.

DG from page 75

at $1,595, which prints 150 char./sec in dot matrix mode and 80 char./sec in letter quality mode. The printer is said to feature 160 by 160 dot/in. resolution, 6 or 8 line/in. printing and compression of spreadsheets requiring more than 132 columns.

- A 160 char./sec, 132-col. printer with a $2,995 price tag, designed as a shared peripheral.
- A parallel line printer controller, for $815, that reportedly supports a 300 line/min band printer.

DG is located at 4400 Computer Drive, Westboro, Mass. 01580.

At CCA's seminar you'll learn about the Intelligent Information Center™ and the newest DBMS tools, like PC-mainframe links.

Attend one of CCA's seminars and you will learn how MODEL 204 DBMS can make both MIS people and corporate executives better at their jobs. You could also win your very own IBM PC.

How MODEL 204 DBMS's new Intelligent Information Center provides complete end user support.

MODEL 204's Intelligent Information Center, a unique group of tools linking end users and computers, allows executives to access the corporate database themselves. Without having to understand anything about mainframe technology.

At the seminar, you'll actually see two of these executive tools in action. One is PC/204, our easy to use PC-mainframe link for automatic spreadsheet definition and creation. The other is ACCESS/204, our decision support query and report writer.

Why time after time MODEL 204 DBMS is so highly rated for ease of use and high performance.

It's true. In recent DATAPRO surveys, MODEL 204 consistently won high marks for Efficiency, and for Ease of Use.

You'll learn why the performance of MODEL 204 is unmatched. And why its complete 4th generation application development system improves productivity 5 to 50 times over conventional methods.

By then you'll understand why MODEL 204 is the fastest growing database management system.

How you can win an IBM PC.

Select a seminar from the schedule below and call or send a coupon to reserve your place. At every seminar, you can enter your name into our drawing for an IBM PC. The winner will be selected from 1984 seminar attendees. The winning name will be drawn Dec. 28, 1984.

You could even win a PC.

CCA's Executive DBMS Seminar Schedule

July		**September**		New Orleans	Sept. 27
Dallas	July 10	Albany	Sept. 20	New York City	Sept. 18
Oakland	July 12	Baltimore	Sept. 25	Rochester	Sept. 13
Portland, OR	July 26	Birmingham	Sept. 25	Sacramento	Sept. 27
San Francisco	July 25	Boston	Sept. 11	Saddlebrook, NJ	Sept. 12
St. Louis	July 12	Chicago	Sept. 5	San Antonio	Sept. 12
August		Cincinnati	Sept. 13	San Diego	Sept. 20
Houston	Aug. 21	Denver	Sept. 13	San Francisco	Sept. 13
Los Angeles	Aug. 30	Hartford	Sept. 27	Tulsa	Sept. 11
Minneapolis	Aug. 28	Indianapolis	Sept. 27	Washington, D.C.	Sept. 20
San Mateo	Aug. 28				

Representatives: Canada, U.K., Europe, Australia, Japan, Saudi Arabia.
In Canada, contact Polaris Computer Systems Ltd., Toronto.

Intelligent Information Center is a trademark of Computer Corporation of America.

Computer Corporation of America

( ) Yes, I'm interested, I'd like to attend. Please call me with details.
( ) I can't attend right now. Please send me information on MODEL 204.

NAME ____________ TITLE ____________
COMPANY ____________
ADDRESS ____________
CITY ____________
STATE ____________ ZIP ____________
TELEPHONE ____________

Operating System: ( ) MVS ( ) DOS ( ) CMS ( ) Other ____________

Computer Corporation of America. A Crowntek Company
Four Cambridge Center, Cambridge, MA 02142 (617) 492-8860

CW8/298

TeleVideo and MCBA have micro-solutions for accounting, distribution and manufacturing

MCBA's time-proven packages are now available in all popular formats including MSDOS® (IBM) C/PM® (TeleVideo) and XENIX® (Altos).

Why settle for software that was developed for micros with limited power? Now MCBA has put mini-power within your reach. And if the day should come when you do need a mini or supermini, MCBA software will move with you. In fact, no matter how much your company expands, you'll find MCBA functionality almost impossible to outgrow. MCBA's time-proven packages are now available in all popular formats including MSDOS® (IBM), C/PM® (TeleVideo) and XENIX® (Altos).

MCBA's packages are being used in 15,000 minicomputer installations worldwide. After 9 years they have established a reputation as the most comprehensive well-tested and sophisticated business software in the industry today.

Combine TeleVideo's TS1605H with MCBA's library of 17 integrated manufacturing, distribution and accounting packages. They can be installed in whatever combination and sequence you need for your business no matter what size you are now, or want to be later.

TeleVideo has given their new TS1605H - IBM/PC-compatible personal computer a long list of standard features to meet all of your professional computer needs.

The TS1605H couples the Intel 8088 microprocessor with the latest in VLSI technology, optimizing space and power. It comes standard with 256 Kbytes of dynamic user memory. It also includes as standard an RS-232C serial port for communications and a parallel printer port. It supports an RGB and composite monitor through ports on the rear panel. For additional expansion it includes an IBM format expansion slot designed to accept any IBM hardware expansion.

Call Plus Distribution today for more details about TeleVideo's systems and MCBA's microcomputer software packages. Call toll-free 1-800-528-0521.

TeleVideo • PLUS DISTRIBUTION • MCBA®

Plus Distribution has total solutions for all of your hardware and software needs. We'd like to tell you about our competitive prices, customer service and our many fine product lines. Call for our summer product catalog, free to retail dealers. Contact us at any of our four branches or call our toll-free number.

ARIZONA	COLORADO	NEW MEXICO	UTAH
11029 N. 24th Ave.	6950 S. Tucson Way - Suite V	2825-C Broadbent Pky., N.E.	1615 W. 2200 S. - Suite B
Phoenix, AZ 85029	Englewood, CO 80112	Albuquerque, NM 87107	Salt Lake City, UT 84119
(602) 246-6477	(303) 799-0320	(505) 345-5501	(801) 973-0898
(800) 528-0521			

COMPUTER INDUSTRY

Big Eight dispute apt to linger

Conflict of interest issue seen as theoretical

By Peter Bartolik
CW Staff

FRAMINGHAM, Mass. — The executive who oversees Arthur Andersen & Co.'s computer services practice believes the dispute over public accounting firms offering information systems services may never be resolved.

But the dispute is an issue with only "a relatively small portion" of computer services companies, claimed Larry R. Levitan, managing director of professional competence with Arthur Andersen, who is responsible for the firm's practices in information technology.


Ryan


Levitan

In a recent interview here, Levitan said companies that offer both auditing and information systems services undergo rigorous scrutiny that ensures no conflicts arise from those practices.

The Association for Data Processing Service Organizations (Adapso) has, for several years, charged that the Big Eight, and particularly Arthur Andersen, should not be allowed to offer computer services in areas where they also conduct independent financial audits.

Noting that the company works with software developers and some of the larger services and teleprocessing companies, Levitan said, "We know and work with many organizations who are part of Adapso, and the impression we have is that it is a relatively small portion of the membership who feel strongly about this."

Levitan said the conflict of interest issue is theoretical and has never been factual. "I would hope Adapso is gaining a better understanding of that," he said. While Adapso has engaged in dialogue with Arthur Andersen and others, little movement has taken place, with some members of the organization demanding the Big Eight separate their DP practices from their auditing practices.

Levitan said half of its informa-

See BIG 8 page 105

MSA, ADR report joint agreements

By John Gallant
CW Staff

CHICAGO — Management Science America, Inc. (MSA), the leading independent supplier of applications software, and Applied Data Research, Inc. (ADR), a leading independent supplier of systems software, recently said they will share technology and jointly market MSA and ADR products.

The MSA-ADR agreement, announced at a press session during the Information Management Exposition & Conference for Software here, calls for MSA to market a version of ADR/Datacom/DB and ADR/Datadictionary along with its manufacturing, human resource and financial mainframe applications packages.

According to MSA Executive Vice-President Dennis Vohs, MSA will act as an OEM supplier for the ADR products, offering MSA customers a restricted-use version of the ADR/Datacom/DB relational data base management system (DBMS) with which to support MSA's applications. The restricted-use arrangement will allow MSA customers to use ADR/Datacom/DB only in conjunction with the MSA products and not for the development of in-house applications.

Vohs said the ADR relational DBMS would be logically embedded in MSA's applications and transparent to users of those products. He added that MSA will deliver the ADR/Datacom/DB versions of its systems, which are currently available, with application definitions for ADR/Datadictionary.

Vohs would not divulge the pricing

See MSA-ADR page 104

Wang disbands its Advanced Systems Lab

By John Desmond
CW Staff

LOWELL, Mass. — Wang Laboratories, Inc. has announced internally that it will soon discontinue its Advanced Systems Lab (ASL), which provided research and consulting on the human factors associated with office automation.

Twelve people employed on the academically oriented ASL staff were told to find other jobs, sources said. One Wang source described the lab's function as one of "bridging the gap between the executive's view of OA and the technologist's view of OA."

Vernell Munson, director of ASL, confirmed that the lab will be disbanded as of July 1. "Beyond that, I have no comment," she said.

According to Charles Miller, Munson's superior, ASL's functions are being transferred to research and development and marketing divisions of Wang. A decision had to be made either to expand ASL or to have it absorbed by other departments, Miller said. "Nobody has just been turned out on the street." But he added that not all the ASL staff accepted suggested transfers to other departments.

The idea for ASL came from Duncan Sutherland Jr., who recently left Wang to join a Houston design and construction firm. Sutherland said ASL was approved by Fred Wang, current executive vice-president and chief of development and the son of founder An Wang. "We realized that demand for human factor support was something the company would have to address," Sutherland said. He said his decision to "focus on customer needs and not spend a lot of time politicking internally" may have cost ASL after he left.

The reason for discontinuing ASL, according to a Wang employee who requested anonymity, was that the group "was not performing a function directly related to the bottom line of the company." However, another knowledgeable source said, "The management . . . didn't really under-

See ASL page 104

$120M

Cullinet Software, Inc. went beyond the $100 million sales benchmark with its recent report on fiscal year 1984/91

■ Different versions of legislation designed to protect semiconductor vendors from pirating have moved through Congress and await a conference to resolve the differences/94

■ Boeing Co. disciplined some employees, and the U.S. Interior Department lifted a one-year suspension that would have barred the company's computer division from competing for government contracts/98

■ Hitachi Ltd. announced it became the third Japanese company to achieve sales in excess of $19 billion/98

Trilogy announcement spurs speculation on Amdahl's plans

INDUSTRY INSIGHT
Robert Batt
CW West Coast Bureau

With the sudden, but not unexpected news that Trilogy Ltd. has shelved its plans to build a large-scale, IBM-compatible processor, much of the recent discussion on the Silicon Valley cocktail circuit has focused on the future of Gene Amdahl, the company's founder.

At his firm's recent annual shareholders' meeting, Amdahl, long regarded as an industry guru, was attempting to put the best possible face on his company's prospects [CW, June 18] at a time when one can only imagine he has been personally devastated by the whole episode.

"I am very sad to see what has occurred. Gene is a respected friend and competitor of all of us in the industry, but unfortunately these things sometimes happen," said David Goldsmith, vice-president of corporate communications at National Advanced Systems, Inc.

At the shareholders' meeting, Amdahl insisted his company's decision to concentrate on wafer-scale integration technology held out the prospect for a reasonable return on investment. Some industry watchers, however, were openly questioning Amdahl's commitment to staying at Trilogy, now that his dream of building a supercomputer has been smashed.

"Quite frankly, I wonder if he'll be interested in hanging on, now that the company's focus has been so narrowed," commented Howard Hagen, director of computer industry service at Dataquest, Inc., a San Jose, Calif.-based market research firm.

"There's no doubt that Gene's credibility has suffered, and he will have a difficult time trying to finance this sort of venture again," added Greg Kelsey, senior technical analyst at Hambrecht & Quist, an investment firm based in San Francisco.

In the weeks and months ahead, much will depend on Trilogy's efforts to broaden the market for its wafer-scale integration technology. Currently, three companies — Sperry Corp., Digital Equipment Corp. and France's CII-Honeywell Bull — have bought licenses for the wafer technology, in return for some hefty investments in Trilogy.

Ask investors to cough up more cash?

Some pundits think Trilogy will ask these computer vendors to cough up even more cash and possibly do some of the development work themselves.

Nevertheless, according to Floyd Kvamme, general partner at Kleiner Perkins Caufield & Byers, a San Francisco-based venture capital firm, the three manufacturers may actually gain by Trilogy's fall from grace.

"They may view this change positively, because the technology for which they invested in Trilogy will now be the primary focus of the company, rather than only one part of it," he remarked.

Personal CAE workstation targeting large market

OUTSIDE LINES
Bohdan Szuprowicz

The powerful computer-aided engineering (CAE) workstations introduced during the last two years have only just began to carve out a market for themselves, but already they are being challenged by the personal computer-based engineering workstations that are becoming available at a fraction of the cost of the larger systems.

Both are targeting a huge population of up to 500,000 electronic circuit design engineers worldwide, most of whom have yet to use such automation devices in their tedious and increasingly complex tasks of integrated-circuit design.

The personal CAE workstation allows an electronic design engineer to use the ubiquitous IBM Personal Computer to capture the design and develop the logic of an integrated circuit. He can then send his computerized design data over the phone to a semicustom integrated-circuit manufacturer and literally sit back and wait for a finished, customized microchip prototype to arrive a few weeks later.

It was only yesterday that specialized very large-scale integration (VLSI) CAE workstations appeared on the scene, wresting away the critical integrated-circuit design market from the more general computer-aided design (CAD) suppliers who did not specialize. Companies like Daisy Systems Corp.; Mentor Graphics Corp.; Valid Logic Systems, Inc.; Silvar-Lisco, Inc.; Metheus Corp; and CAE Systems supplied sophisticated software systems integrated into powerful 32-bit micros or minis with networking capabilities and literally took the VLSI design market by storm.

However, although those workstations are a vast improvement over the general CAD systems and often much cheaper, they are nevertheless too expensive and too complex to be operated by the vast majority of electronic circuit designers. This is where the personal CAE workstation comes in. Already industry observers predict that anyone who can package such a system for less than $16,000, and make it simple enough to operate for an average electronic engineer who is not an expert in integrated circuit design, has an excellent chance of making it big in this exploding market, if he only moves fast enough.

Suppliers of personal CAE workstations and services are betting on a new, competitive scramble among manufacturers of any product with an electronic circuit, from self-diagnostic dishwashers to talking automobiles, intelligent robots and voice/data telephones. Use of custom integrated circuits can set such products apart from your competition, and the new personal CAE workstations are the cost-effective tools that make it all possible.

There are already a few thousand sophisticated VLSI CAE workstations installed, primarily used by the custom integrated-circuit fabricators and large electronics manufacturers. The latest industry estimates suggest, however, that by the end of 1984 as many as 100,000 IBM Personal Computers will be used in electronic circuit design, and all of those have the potential to become low-cost personal CAE workstations. In fact, a two-tier market is shaping up in which personal CAE units will be used for initial circuit design, schematic capture and network listing, which are then transmitted to a design center with more sophisticated VLSI CAE workstations and mainframe computers. There, expert integrated-circuit engineers can check the logic and develop the remaining data required to produce your proprietary custom microchips.

As a result, several new companies are rushing in to offer personal CAE workstations on the IBM Personal Computer, which can also double up in many other administrative and computing tasks for which software packages are readily available. Most newcomers offer specialized software that makes an IBM Personal Computer a personal CAE workstation and also provide access to a more powerful design center and a choice of two or more microchip fabricators. This is critical to the design engineers who like to have an assurance of several sources for a particular microchip with which they are developing new products. Second sourcing in this game is another tactic of survival in this very competitive business.

Futurenet is emerging as one of the leading personal CAE workstation suppliers, claiming more than 1,000 IBM Personal Computer-based installations worldwide, with units operating in nine of the top 10 electronic firms in the U.S. The company also signed an agreement with LSI Logic, a leading custom gate array microchip manufacturer, which will supply its library of parts, and with HHB-Softron for logic simulators to

See VLSI page 104

Szuprowicz is president of 21st Century Research of North Bergen, N.J., and publisher of Supergrowth Technology USA.

Introducing dBASE™/*Answer*™—the first micro-mainframe link that allows PC users to use mainframe data while taking full advantage of all Ashton-Tate's dBASE,™ FRIDAY!™ and FRAMEWORK™ software.

Finally, your end users can get the most from your corporate micros.

Informatics General and Ashton-Tate have joined forces to create a micro-mainframe link which works with Ashton-Tate's best-selling software.

This all-new dBASE/*Answer* system is the next logical step in the corporate use of micros. That's because it delivers end users more capabilities than ever before, including:

- **Universal Access** to IMS, IDMS, TOTAL, ADABASE, VSAM and virtually all other database management systems which operate on IBM mainframes.
- **Complete Support** for all dBASE, FRIDAY!, and FRAMEWORK software systems. Now end users can download information for database management, reporting, and distributed application development and use.
- **Ease of Use,** so even novice end users can get more information from their micro computers. All they have to do is select options (assisted by prompting) and dBASE/*Answer* handles mainframe interface and data delivery. The user receives completely formatted files, ready for use with dBASE, FRIDAY!, and FRAMEWORK software systems.

In addition to all the end user benefits with dBASE/*Answer*, Data Processing professionals also get:

- **Security** at the micro, mainframe, database *and* content level. dBASE/*Answer's* unique password and user profile capabilities allow you to limit the information each end user can access.
- **Control** over system resources. Using dBASE/*Answer's* request classification capabilities, your data processing department can provide immediate *or* deferred response to end user requests.
- **Selectivity** through dBASE/*Answer's* qualification logic ability. It allows end users to select and qualify the data they want—and you to deliver only the data they need.

Get the facts on dBASE/*Answer* and receive a *free* Demonstration Diskette.

dBASE/*Answer* from Informatics can actually help you get your money's-worth from your company's investment in micro computers. And the easy way to see for yourself is by using the *free* Demonstration Diskette in your own micro computer.

To reserve your free dBASE/*Answer* Demonstration Diskette, mail this coupon today or call toll free

1 800 227-3800 Ext. 911

(In Canada, call collect 416-498-7192)

informatics general corporation

THE SOFTWARE ENGINEERS

FREE dBASE/*Answer* DEMONSTRATION DISKETTE REQUEST

☐ **YES.** I want to know how dBASE/*Answer* can help me get the most from my company's micros. Please contact me to deliver a free Demonstration Diskette without cost or obligation.

☐ I'd like more information on dBASE/*Answer*. Please see that I get the full details, without cost or obligation.

Your Name_____

Title_____

Company Name_____

Phone No._____ (Incl. Area Code)

Address_____

City_____ State_____ Zip_____

Mail to: Informatics Free dBASE/*Answer* Information
P.O. Box 1452, Canoga Park, CA 91304 CW-82

SOMETIMES A PER
JUST ISN'

PRESENTING THE NCR TOWER.™

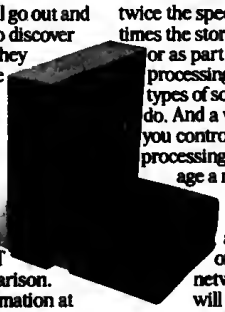
This year, a lot of businesses will go out and buy personal computers only to discover thousands of dollars later that they need something more to handle their problems.

Something more powerful. More expandable. More economical. That something is the NCR Tower.

WHEN PERSONAL COMPUTERS AREN'T POWERFUL ENOUGH.

Compare the Tower with a personal computer like the IBM XT and you'll find there's no comparison.

The Tower processes information at twice the speed. It comes with over four times the storage capacity. It can stand alone or as part of a large distributed data processing network. It runs all the different types of software that personal computers do. And a whole lot more. They can help you control inventory better. Run a data processing department better. Even manage a nationwide network of hospitals or auto parts stores better.



In short, whether you run a small business, a department of a large business or a nationwide network of businesses, the Tower will help you do business better.

Why does the Tower perform so well? Because it's built so well.

It is powered by the Motorola 68000, one of the most powerful 16-bit microprocessors around. It comes with other guarantees of high performance like a Winchester hard disk and the Intel Multibus.* And it offers you a choice of two operating systems—RM/COS and UNIX.* So it's simple enough for vice-presidents (just plug it in and go) or sophisticated enough for techies (you can do your own thing).

WHEN PERSONAL COMPUTERS AREN'T EXPANDABLE ENOUGH.

Any small business computer will grow as you grow. The question is, how far?

The Tower's storage capacity expands

SONAL COMPUTER
T ENOUGH.

from 40 million characters to 214 million. Translated, that means it will hold anywhere from 13,000 to 71,000 pages of text (it's not for short story writers) or from 260,000 to 1,420,000 names and addresses (you'd better have plenty of friends).

Even more important, up to twelve people can work on the Tower at once with additional work stations. On different projects. Or the same project.

WHEN PERSONAL COMPUTERS AREN'T ECONOMICAL ENOUGH.

Of course, you may save money in the short run by investing in a personal computer. But if it can't do everything you want it to, it could really cost you in the long run.

What's more, the Tower becomes more economical as you add more work stations. With eight work stations, for example, it ranges from $25,000 to $36,000. Eight IBM XT's, on the other hand, will cost you $45,000. Networking them all together would set you back even more. And you still wouldn't have anywhere near the power of the Tower.

Quite simply, the Tower gives you something no single personal computer or group of personal computers can: enough power, expandability and economy to handle your business problems. Put another way, the Tower is a computer you can grow into, not out of. No other machine on the market offers everything it does at the price it does.

And finally, it comes to you from NCR. A company committed to applying innovative computer technology to today's business problems. And one which offers its customers support and service from 1,200 offices throughout 120 countries.

For more information, dial us toll-free at 1-800-CALL NCR.

NCR

INNOVATIVE COMPUTER TECHNOLOGY. YOU CAN EXPECT IT FROM NCR.

Imposing legal liability on DP vendors: two theories

LEGAL VIEW

By Christopher M. Mislow
Special to CW

First of three parts

Despite revolutionary technological advances, the computer industry has not yet devised a way to circumvent Murphy's Law.

Computer system malfunction is not inevitable, but it is far from infrequent. The financial losses sustained by users of malfunctioning computer systems can sometimes destroy a user's business altogether.

Computer system malfunctions have spawned a proliferation of lawsuits rivaling the growth of the computer industry itself. So far, legal liability has been imposed upon computer system vendors primarily under two theories: breach of warranty and fraud.

Contracts for the sale of goods are governed by the Uniform Commercial Code (UCC). Under the UCC, a vendor may be held liable for his breach of an express warranty, for his breach of an implied warranty or both.

Express warranties do not require any talismanic words such as "warranty." Any statement of fact concerning the goods to be sold or any description of these goods will give rise to an express warranty that the statement or description is true.

Although they often arise from statements made in a sales document, express warranties can be created orally as well. In one case, for example, Burroughs Corp. had agreed to sell to an automobile dealer a small computer to be used for accounting purposes. Although the written contract mentioned only hardware, Burroughs' salesman had orally agreed to provide 13 application programs designed to meet the user's needs. These programs were delivered, but were never operable. As a result, Burroughs was held liable for breach of express warranty.

An implied warranty, as the phrase suggests, does not require any statement by the vendor. An implied warranty that goods are "fit for the ordinary purposes for which such goods are used" arises automatically.

In addition to this general implied warranty, there also exists an implied warranty of fitness for a particular purpose. A warranty that the goods are suitable for a special purpose is deemed to accompany the sale when a vendor has reason to know of some special purpose — beyond "the ordinary purposes for which such goods are used" — for which a purchaser needs the goods in question and is aware that the purchaser is relying upon the vendor's skill to select suitable goods.

The second legal theory upon which computer system vendors have been found liable is fraud. Fraud occurs when a person makes a false representation of fact, knowing at the time that it is untrue. Although instances of deliberate fraud are rare, fraud also occurs when a misrepresentation of fact is made recklessly, without regard for whether the representation is true or false. Under this less rigorous standard, a number of computer system vendors have been found liable for fraud on the basis of overzealous sales pitches.

Fraud and breach of warranty are relatively traditional legal theories that may be difficult to apply to dynamic changes in computer technology. As the computer industry evolves, therefore, it is likely that new legal theories will be adopted, or at least existing ones adapted.

One phenomenon which is already creating pressure for new theories of legal liability is the increasing disparity in expertise between computer vendors and users. No longer is the computer market restricted to large institutional mainframe users; microcomputers have opened up the market to a class of smaller, far less sophisticated users. The pace of technological change, moreover, has left even many experienced users in the position of virtual neophytes.

Consequently, users often have unrealistic expectations. They frequently tend to view the computer not as a complex system with specific advantages and limitations for specific applications, but rather as a mysterious panacea that will somehow instantaneously and cost-effectively solve whatever problems prompted them to consider automation in the first place. Not all users are this naive, of course. Nevertheless, most depend on their vendor's expertise and are thus easy prey to a smooth sales pitch.

Because so many users are unable to protect themselves when purchasing a computer system, several new theories of legal liability have been proposed in order to ensure the purchasers of deficient computer systems of an effective remedy.

One such theory is computer malpractice. Like doctors and lawyers, it is argued, computer vendors possess

See LAW page 104

Mislow is an attorney with the Salt Lake City firm of Giaque and Williams.

Cullinet's revenues break $100 million sales threshold

WESTWOOD, Mass. — Breaking the $100 million sales threshold, Cullinet Software, Inc. reported recently that revenues for the fiscal year ended April 30 were $120 million, a 59% increase over the $78.3 million reported in the previous year.

Profits for the year were $16.4 million, or $1.09 per share, a 43% increase over the previous year, when profits were $11.5 million, or 81 cents per share.

For the fourth quarter, which ended April 30, the company reported revenues of $35.1 million, a 50% increase over the $23.4 million reported in the previous year.

Profit for the quarter was $4.8 million, or 32 cents per share, compared with $3.5 million, or 23 cents per share, in the year-earlier period, representing an increase of 36%.

The company also reported that costs and expenses for the year climbed 53% over the previous year to $95.1 million. For the quarter, costs and expenses climbed 50% over the year-earlier period to $27.9 million.

The company noted that it has reported 50% or greater growth in revenues in each of the past five years.

Robert N. Goldman, president and chief operating officer, said, "Cullinet is especially pleased to have achieved another milestone in the company's history this year by exceeding $100 million in revenues.

"Our increased presence in the applications sector of the software market and the increasing acceptance of our one-vendor solution to data processing needs have provided us with the means to reach this measure of success."

IBM names fellows, awards cash

SAN FRANCISCO — Five specialists in such fields as data communications, computer programming and material science were recently named IBM fellows, the computer giant's highest technical honor for its employees.

IBM also announced cash awards totaling more than $2.7 million, recognizing the achievements of 79 other employees. The awards were announced at IBM's annual technical recognition event here June 7.

The five new fellows are Dr. James P. Gray of the Communications Products Division in Raleigh, N.C., who specializes in the area of communications architecture; Dr. Mu-Yue (Ben) Hsaio of the Data Systems Division in Poughkeepsie, N.Y., who specializes in the fields of computer reliability, availability and serviceability; Dr. Allan L. Scherr of the System Products Division in White Plains, N.Y., who is a leader in the development of operating software for large IBM systems and networks; Dr. Rao R. Tummala of the General Technology Division in East Fishkill, N.Y., a specialist in materials science; and Dr. Gottfried Ungerboeck of the IBM Research Laboratory in Zurich, Switzerland, a specialist in data transmission and signal processing.

The IBM fellows are selected for their sustained technical achievement and can pursue research and technical projects of their choice for at least five years.

Included in the total cash awards were two special corporate products awards totaling more than $1.7 million. Those awards were shared by 48 employees for development and manufacturing efforts involving the IBM Personal Computer and the IBM 3380 direct-access storage device.

Awards amounting to $955,000 were presented to 31 employees for their various innovations in IBM products.

WHAT'S BEHIND OUR CONVERSATIONAL TERMINAL MAKES WHAT'S IN FRONT OF IT MORE PRODUCTIVE.

At Teletype Corporation, we just made another intelligent move. We added an integrated modem to the 5410 conversational terminal—making it an even better value.

In addition to saving desk space and being cost-effective, the modem gives the 5410 "built-in" intelligence that greatly improves operator productivity. For example, all the operator has to do is push a single key, and the modem will dial a host computer and perform the logon operation. And the operator can store up to three phone numbers and logon strings in the modem. Automatic answering is another feature of the modem, which is 212A compatible.

The 5410 is also now available with a white, green or amber Phosphor. No matter which color you choose, your operators will appreciate the crisp, easy-to-read characters. High resolution is maintained even when switching from an 80 to 132 column mode.

Other features that enhance productivity include 8 programmable function keys with matching screen labels; an English option menu; a detachable keyboard that tilts from 5 to 12 degrees and has tactile feedback; standard character sets; and the list goes on and on.

In the interest of operator productivity, write to Teletype Corporation for more information on the 5410 at: 5555 Touhy Ave., Dept. 3223-F, Skokie, IL 60077. Or call 1 800 323-1229, ext. 101.

TELETYPE: VALUE SETS US APART.

"Teletype" is a registered trademark and service mark of Teletype Corporation.

AT&T
Teletype Corporation

IBM micro price cuts seen disguising deeper problem

By Robert Batt
CW West Coast Bureau

SUNNYVALE, Calif. — IBM's recent price cuts for its Personal Computer were designed, in part, to disguise weaknesses in the product's competitive position, according to Will Zachmann, vice-president of corporate research at International Data Corp. (IDC).

Speaking at a breakfast session recently on "User Buying Patterns and Distribution Trends," sponsored by the Framingham, Mass.-based market research firm, Zachmann said the "myth of IBM's invincibility" is now being sorely tested.

According to Zachmann, the recent price cuts suggest that the Personal Computer has reached the climax of its popularity much more quickly than anyone predicted.

'Defensive move'

"It just could be that IBM is building up a massive inventory of [Personal Computers] in its distribution pipeline, and the only way to get rid of [the computers] is to sell them cheaply. From that point of view, the price cuts are a defensive move, rather than the aggressive one they were painted to be," he asserted.

The notion that low-cost production and commodity pricing are the ways to maintain a competitive stance in the marketplace is a doubtful one, Zachmann continued.

What will make the difference in determining the survivors and winners over the next five years, he suggested, is innovative products that give the user access to relevant technology and the ability of vendors to tell the story of such innovation in a way that customers themselves consider the innovation useful.

Apple setting tone

In this regard, Zachmann said, Apple Computer, Inc., with its Macintosh computer, is setting the tone for 1984. "Through the Mac, Apple has brought into existence an innovative technology that is changing the rules of the game this year, and the myth that microcomputer vendors must be IBM-compatible has been broken," he claimed.

The issue of pricing was also raised at the briefing by Aaron Goldberg, IDC's research manager. He referred to the "phantom elasticity of pricing," in which merely having a 5% to 10% better price/performance per feature will not make any real difference, he asserted.

"As an industry, we get caught up with thinking that innovation is a purely technological phenomenon. Technological elegance, however, is not a measure of innovation, user acceptance is," Goldberg told his audience.

Complacency problem

There is, he claimed, a problem of complacency in the microcomputer industry with most vendors afraid to take the first step.

However, "understanding the need of users before the user does is the name of the game," he added.

A third speaker at the briefing, Gene Collins, vice-president of distribution for World of Computers, a Denver-based microcomputer franchise company, focused on the role that vendors should play in supporting their dealer networks.

The job of the dealer, he noted, is to sell products, rather than to be tied up with maintenance or technical support efforts. It is critical that vendors give their dealers adequate training at the outset in order to minimize the amount of time spent on post-sales customer service.

"Vendors can attract a great deal of loyalty from their dealers, but only if they share their product plans with them and maintain confidence in the relationship between the two parties.

"If, for example, the vendor floods the various distribution channels with the same product, the confidence of the dealer network will soon disintegrate, and prices and the perceived value of the product will both drop," he warned.

COMPUTER INDUSTRY

Senate, House approve bills to protect chip makers

By David Gross
CW Staff

WASHINGTON, D.C. — Legislation designed to protect semiconductor chip manufacturers from illegal pirating has been approved by both congressional bodies, though in different forms.

The House on June 11 approved a bill that would give chip makers the exclusive right to sell and distribute their designs for 10 years. The bill was passed unanimously under suspended House rules that waived debate.

A Senate bill approved in May also seeks to offer protection for chips, but it takes a different approach from the House bill.

Senate version

The Senate version would recognize chip designs as "intellectual property," much like a book or record, protected by the U.S. Copyright Act of 1976. Like the House version, the Senate bill would protect the chip makers' rights for 10 years.

The House bill does not offer copyright protection, but would set up a unique kind of registration for the "masks" used to produce chips.

Rep. Don Edwards (D-Calif.), who sponsored the House bill, said the legislation culminated six years of effort by the industry to combat chip piracy.

Richard Stern, a copyright and patent attorney representing the Semiconductor Industry Association, a San Jose, Calif., trade group, said the group supports both the House and Senate bills.

Both the Copyright Office and the Association of American Publishers have supported the House version, arguing that chips are a "useful" item that should not come under the same kind of copyright protection as a book or music.

Stern said the industry does prefer one provision of the Senate bill that makes protection available as of Jan. 1, 1980. The House version would make protection effective the beginning of this year.

"The effective date is a dollar and cents issue," Stern said. He noted that some leading microprocessor models, such as the Motorola, Inc. 68000, Zilog, Inc. 8000 and Intel Corp. 80186, came to market between 1980 and 1984.

Another difference between the bills that will have to be ironed out by the House and Senate pertains to the penalties for chip piracy. The House bill contains no criminal penalties, but establishes civil penalties of up to a $250,000 fine. The Senate version, on the other hand, incorporates the civil penalties set forth in the copyright act.

IF YOUR OFFICE IS FULL OF MACHINES THAT WRITE,

YOU NEED ONE THAT READS.

It's called the Dest WorkLess Station.™

It reads typewritten information right off the page.

And it's fast.

So fast, it reads and transfers eight pages into your office computer* in two minutes flat.

Which is quite a feat, when you consider it would take two hours to keyboard them on a good day.

Once you've got the information into the system, you can do just about anything with it.

Including word processing.

Electronic filing.

And electronic mail.

With the Dest WorkLess Station, your people can spend less time feeding information into the computer. And you can spend more time deciding what to do with the results.

Which means, the answer to greater productivity may not be another writing machine.

Just one that reads.

For more information, contact Mary Thorpe at (800) 538-7582. In California call (408) 946-7100.

Send me more information about the Dest WorkLess Station.

Name_____

Title_____

Company_____

Address_____

City_____ State_____

Zip_____ Phone # _____

My office computer is a_____

_____

DEST

Mail To: Dest Corporation
1201 Cadillac Ct., Milpitas, CA 95035

*The Dest WorkLess Station is compatible with word processors including IBM, Wang, Digital, Xerox, Exxon, NBI, CPT and most PC's. WorkLess Station is a trademark of Dest Corporation.

Government lifts ban on Boeing pacts

By David Gross
CW Staff

WASHINGTON, D.C. — The Interior Department recently lifted a suspension that would have barred Boeing Co.'s computer group from bidding on any government contract for at least a period of one year.

An agreement reached June 15 between the government and the aerospace concern cited certain disciplinary actions taken by the Boeing Computer Services Co.'s Federal Systems Group. Harold Carr, a spokesman for Boeing in Seattle, said more than 10 employees in the computer unit have been fired, suspended without pay or issued reprimands.

Last month, the Federal Systems Group was barred from receiving government contracts after federal investigators accused it of illegally obtaining and benefiting from bid information submitted by other bidders. The incident involved a $5 million software development contract Boeing won from the National Park Service earlier this year.

Federal investigators determined that officials of the group had helped to write some of the criteria used to evaluate the bids and had failed to notify the government of the conflict of interest violation. The contract has since been rescinded.

Tom Wilson, a spokesman for the Interior Department, said Boeing took the disciplinary action "on its own initiative."

"We took action because we obviously found that certain employees had not lived up to the conduct we expect of an employee," Carr said.

Wilson said the inspector general is continuing an investigation into the role that Interior Department or Park Service officials may have played in helping Boeing to obtain the confidential bid information.

IBM names director of economics

Responsible for conducting economic studies, analyses

ARMONK, N.Y. — Nancy H. Teeters has been named director of the economics department at IBM, succeeding Alvin J. Karchere, who retired from IBM last November.

Teeters will be responsible for conducting IBM's economic studies and analyses and for consultation on economic matters.

Teeters was the first woman to serve as a governor of the Federal Reserve Board. She was appointed by former President Carter to that post in 1978. Her term expired in January, and she has continued in that position pending the nomination of a successor, whom President Reagan recently nominated.

From 1974 to 1978, Teeters was the chief economist for the House Budget Committee. From 1973 to 1974, she served as a senior specialist at the Congressional Research Service of the Library of Congress.

Prior to that position, she was a senior fellow at the Brookings Institution in Washington, D.C., from 1970 to 1973.

CAE seen vital to U.S. role in foreign marts

BOSTON — Computer-aided engineering (CAE) will be vital to the competitiveness of U.S. businesses in the international marketplace, a computer company executive remarked here recently.

"American business has been pressured by foreign competition, the need for higher productivity and a shortfall of engineering talent," said Charles M. Hevenor, president of Engineering Automation Systems, Inc., a Wethersfield, Conn., maker of CAE workstations. "Advances in high technology are essential to meeting these challenges."

In remarks at the Computer-Aided Design Conference East trade show here, Hevenor asserted that CAE/CAD can help solve some of the problems facing U.S. industry.

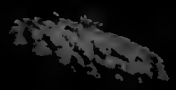
Cooperation key

"With the cooperation of business, government and educational institutions in basic and applied research, we will fully use and expand new technologies that will further strengthen our ability to compete in the global marketplace," Hevenor maintained.

Hevenor said he believes American business is moving to develop the new engineering technologies to achieve the kind of advances he deems necessary. He cited applications software and hardware with powerful computational capabilities that address highly specialized CAE requirements.

"The impact of the personal computer as an engineering workstation has been substantial and has helped us meet many of the challenges facing us," he said.

"By combining the [personal computer's] accessibility with today's mass-marketed software and specialized applications packages, CAE revolutionizes the engineering environment."



Hitachi profits, sales hit sixth all-time high

NEW YORK — Hitachi, Ltd. announced here recently that the fiscal year ended March 31 produced its sixth consecutive all-time high in profits and sales and that it became the third Japanese company to attain sales in excess of $19 billion.

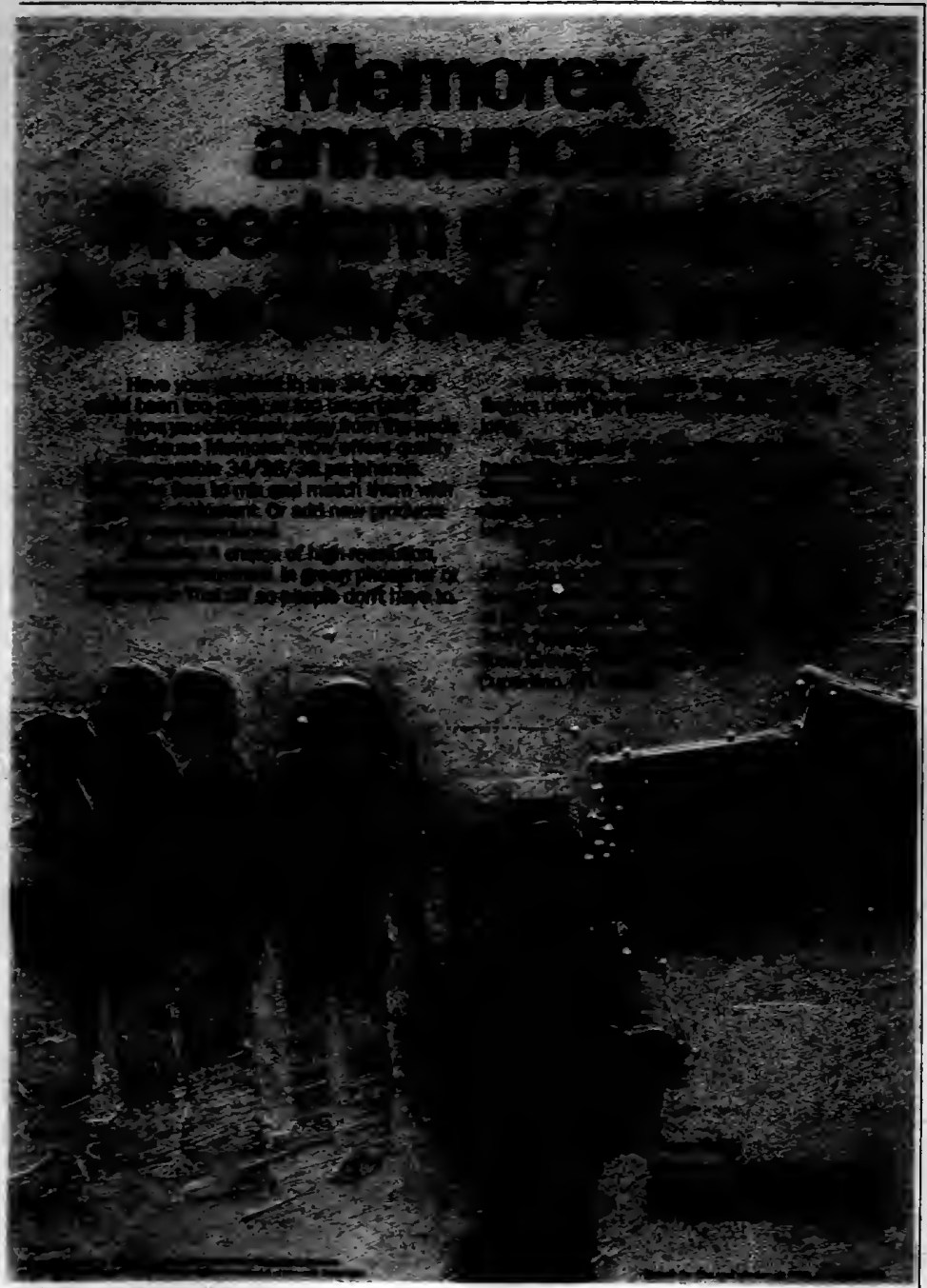
In dollar figures, calculated at the exchange rate prevailing on the Tokyo Foreign Exchange Market as of March 31, the giant electronics and electrical equipment manufacturer registered net sales of $19.4 billion, an 11% increase over the previous year.

Profits were $743 million, or 26 cents per share, also 11% ahead of the previous year, when profits were $669 million, or 24 cents per share.

An Hitachi spokesman said the results were attributable to "a remarkable advance by the electronics division, which realized a 29% increase [in revenue] over the previous year. Semiconductor operations showed an especially large increase of 45%, while the size of the computer operations expanded by 22%."

Revenues from information and communications systems and electronics devices were $5.2 billion in the fiscal year just ended, compared with $4.04 billion the previous year.

International sales revenues by all Hitachi segments were $5.4 billion, up from $4.8 billion the previous year.



Wang sets Intecom stock pact

LOWELL, Mass. — Wang Laboratories, Inc. and Intecom, Inc. have completed a stock purchase agreement announced last April that provides for a comprehensive joint development relationship between the two companies.

Under the agreement, Wang has acquired 1.5 million shares of Intecom common stock for $22.5 million. In addition, Wang and Olivetti Realty N.V., a subsidiary of the Italian office equipment maker, have reached an agreement in principle, whereby Wang will purchase 1,757,000 shares of Intecom stock held by Olivetti.

Wang's purchase of the Intecom and Olivetti shares, combined with Wang's purchase of more than 1.7 million shares on the open market, constitute more than a 15% interest in Intecom.

Intecom is an Allen, Texas-based manufacturer of voice and data communications equipment.

School starts CAD center

BERKELEY, Calif. — Construction has begun on an $18 million research center for the computer-aided design (CAD) of microelectronic circuitry at the University of California's campus here.

The purpose of the facility, scheduled for completion next year, is to develop improved computer-aided design equipment that will be used to design, manufacture and test advanced chips.

Fifteen computer companies are providing construction funds and computer equipment for the center, including Advanced Micro Devices, Inc.; Hewlett-Packard Co.; Hughes Aircraft Co.; IBM; Intel Corp.; National Semiconductor Corp; and Tektronix, Inc. All 15 firms will be able to send a researcher to the center.

Most of the research will be carried out by graduate students and faculty in the Department of Electrical Engineering and Computer Sciences and the Electronics Research Laboratory.

Among the projects planned for the center is the development of computer programs to create and "edit" new patterns of microelectronic circuitry. The programs also are said to have the capacity to reduce the size of proposed circuits.

AT&T IS IN MUSIC.

to place those orders the same way. So, in the store, a hot record is never out of stock and the music never stops.

The people of AT&T Communications are thinking about your business in ways you never thought of.

We can help improve the accuracy of the orders you place or fill.

And the time it takes to place or fill them.

We can help you get instant access to inventory information so you're almost never overstocked or understocked.

And tie in key customers electronically to your existing data network.

The fact is that our people can help you in your business, no matter what kind or size of business you're in.

Account teams assigned to larger businesses. Or Account Reps who can help smaller businesses over the telephone.

Or operators to help set up a teleconference or place collect calls.

can help you tailor a full range of long services based on your com- including:

AT&T Long Distance for low-volume data transfer of purchase orders.

AT&T 800 Service for a toll-free data link with customer terminals.

The ACCUNET* family of innovative digital services such as DATAPHONE* Digital Service and ACCUNET* Packet Service to address your more sophisticated distribution system requirements.

To find out more about how we're thinking about your business in ways you never thought of, call your Account Executive at AT&T Communications. Or 1 800 821-2121.

AT&T

Printronix files suit against Tally for alleged patent infringement

LOS ANGELES — Printronix, Inc. has filed suit in federal court against Mannesmann Tally Corp., charging patent infringement relating to the company's sale of computer printers.

Filed in U.S. District Court for the central district of California here, the suit alleges that Tally, a Kent, Wash.-based terminal and peripherals manufacturer, infringed on U.S. patents owned since 1974 by Printronix, a printer manufacturer based in Irvine, Calif.

The suit specifically accuses Tally of using Printronix patents in the design,. manufacture and sale of its MT630, 660 and 690 line of dot matrix printers. According to David Mayne, Printronix senior vice-president, the patents involve the hammer imprinting mechanism and shuttling device that permits dot imprinting.

The suit seeks an unspecified amount in damages and an injunction against Tally ordering it to cease its alleged infringement activities. Mayne said the action against Tally is consistent with the company's "stated policy" to enforce its patent rights in court.

John Cooper, director of product marketing for Tally, said, "We do not believe we have violated any valid Printronix patents."

Wicat Systems reports loss

OREM, Utah — Wicat Systems, Inc. reported a $13.4 million loss, representing 70 cents per share, for the fiscal year ended April 1, as revenues declined by 8% from the previous year. For the fourth quarter, the microcomputer systems vendor reported a $6.9 million loss, or 34 cents per share, including a write-off of $4.1 million and a 35% decline in revenues from the year-earlier quarter.

During the fourth quarter, according to Wicat Chairman Dustin H. Heuston, revenues were ahead of the second and third quarters of 1984, and the operating loss (excluding the write-off) was not as great in the fourth quarter.

The company took a charge against earnings to cover inventory and bad debts, prompted by a sharp second-quarter decline in orders for Wicat's computer-aided education and training systems, according to Heuston.

For the year, the company reported revenues of $23.2 million, compared with 1983 revenues of $25.3 million. The $13.4 million loss for the year compared with a 1983 loss of $4.1 million, or 27 cents per share. For the fourth quarter, the company reported revenues of $5.9 million, compared with year-earlier revenues of $9.1 million; the $6.9 million loss for the quarter compared with a year-earlier profit of $621,000, or 4 cents per share.

C. Itoh plans direct sales

WALTHAM, Mass. — C. Itoh Digital Products, Inc., a recently formed subsidiary of C. Itoh & Co. Ltd. of Japan, has announced that C. Itoh printers, which are distributed by Leading Edge Products, Inc., will now be marketed directly to dealers and retail markets.

A distribution contract between C. Itoh and Leading Edge was due to expire in June 1985. Under the new joint agreement, C. Itoh will expand its direct marketing program to the approximately 4,000 dealers previously served by Leading Edge, according to C. Itoh.

A marketing staff of 30 from Leading Edge will work for C. Itoh out of its Norwood, Mass., office, the company said.

Afips expo ship to sail to Asia early next year

RESTON, Va. — The boat *World Wide Expo* is scheduled to sail to six cities in the Far East as part of the American Federation of Information Processing Societies, Inc.'s (Afips) first international conference, Afips-Asia '85, scheduled for Feb. 14-March 2, 1985.

The expo plans to visit Tokyo, Osaka and Kitakyushu, Japan; Taipei, Taiwan; Hong Kong and Singapore.

The ship features two exhibition halls that reportedly can accommodate 100 exhibitors in an area of 3,000 square meters. Afips plans to schedule a number of seminars at the conference.

"Japan, Taiwan, Hong Kong and Singapore are committed to high technology," said Dr. Stephen S. Yau, vice-president of Afips. "According to the U.S. Department of Commerce, these markets will expand to more than $14 billion in the next five years."

More information is available from Afips at 1899 Preston White Drive, Reston, Va. 22091.

COMPUTER INDUSTRY

EXECUTIVE CORNER

Paul Gasparro has been appointed president and chief operating officer at Volcetek Corp.

■

Kim Maxwell has been named president of Racal-Vadic, Inc.

■

Lavelle R. Gibson has resigned as president and chief executive officer at California Devices, Inc. for personal reasons. Board member Jim Riley will be acting as chief executive officer until a replacement is chosen.

■

Lawrence G. Finch has been appointed president and chief executive officer of Paradise Systems, Inc.

■

Steven C. Walker has been named president and chief operating officer at Emcom Corp.

■

V. Peter Haug has been named president of Mirror Images Business Systems, Inc.

■

James M. Bridges has been appointed president of System Development Corp.'s services group.

■

Richard T. Gralton has joined Columbia Data Products, Inc. as president and chief operating officer.

■

Steven R. Nelson has joined Wayne Green Enterprises, Inc., of Peterborough, N.H., as executive vice-president and general manager of its newly formed Evergreen Software subsidiary, which will publish computer software for personal, business and educational applications.

Wayne Green Enterprises is a subsidiary of the International Data Group (IDG) of Framingham, Mass. Other IDG subsidiaries include CW Communications, Inc., publisher of *Computerworld*, and the International Data Corp.

■

Phyllis S. Swersky has been elected senior vice-president, finance, of Cullinet Software, Inc.

■

Cliff Goetting has been appointed to senior vice-president of operations at Atasi Corp.

■

George Saterson has been appointed to senior vice-president and chief operating officer of Charlton Associates, Inc.

■

Thomas Kohl has been named executive vice-president and chief operating officer of VG Systems, Inc.

Frank White has accepted the position of vice-president of manufacturing at Valid Logic Systems, Inc.

■

John V. Harker has been appointed executive vice-president of Genicom Corp.

■

Kenneth R. Pannia, vice-president of Tandon Corp., has resigned to pursue personal, non-business-related interests.

■

Scientific Atlanta, Inc. has appointed the following to vice-president and group executive: **Samuel D. Davis**, instrumentation and **James A. Hart Jr.**, broadband communications.

■

Doris D. Benesik, formerly vice-president, engineering, was appointed to the new position of vice-president, operations, and will be responsible for Datapoint Corp.'s manufacturing, engineering, quality and program management functions. She will report to Edward P. Gistaro, Datapoint president and chief operating officer.

■

David C. Drechsel has been appointed to vice-president of Telephony Sales at Computer Consoles, Inc.

■

Martin J. Chizmick has been appointed to corporate vice-president of corporate program management, and **Mervay R. Mahoney** to vice-president of international operations at Storage Technology Corp.

■

Gilbert H. Hoxie has resigned as chairman and chief executive officer at Context Management Systems.

■

Wayne A. Babich has been named director of software development at Interactive Images, Inc.

■

Franc R. J. De Weeger has been appointed president of ASM America, Inc.

■

Jack Bowen has been appointed president of Cellular Business Systems, Inc.

■

F. Javed Chaudhary has been appointed to senior vice-president, chief operations officer at Summagraphics Corp.

■

The following promotions have been announced by CBS Software: **Marylyn Rosenblum**, vice-president, product development; **Robert Levier**, vice-president, operations; **Barry Dones**, vice-president, sales; and **John Rosen**, vice-president, marketing.

■

The following promotions have been announced by Avatar Technologies, Inc.: Dr. **Frederik D. Wiersema**, vice-president, planning and marketing; **Paul J. Rasconi**, vice-president, finance; and **Michael S. Kudla**, director of manufacturing.

■

Advanced Electronics Design, Inc. announces the appointments of **Agostino Bursio**, vice-president, engineering, and **Edward W. Unkart**, vice-president, finance.

■

George Casela has been appointed vice-president, international operations at Columbia Data Products.

■

Leroy W. Beers has been elected vice-president, technical staff, and **George R. Gaserwitz**, vice-president, operations staff, at Burroughs Corp.

COMPUTER INDUSTRY

NICKELS AND DIMES

Duquesne Systems, Inc. reported revenues for its fiscal quarter ended March 31 of $1.8 million, compared with $1.1 million one year earlier. Profits were $363,863, or 18 cents per share, compared with $174,514, or 11 cents per share, last year.

■

Equitec Leasing Co., Oakland, Calif., announced the closing of a venture lease with **Disc Technology Corp.**, Billerica, Mass. The $2 million line of credit was concluded under Equitec's venture leasing program.

■

Sterling Software, Inc. announced revenues in the second quarter of fiscal 1984 rose 269% to $4.9 million, compared with $1.3 million last year. Profits for the three months ended March 31 increased 148% to $340,000, or 8 cents per share, compared with $137,000, or 7 cents per share, for the same period last year.

■

Recognition Equipment, Inc. reported profits for the quarter ended April 30 of $1.9 million, or 25 cents per share, compared with $6.6 million, or $1.05 per share, for the same period last year. Revenues were $33.2 million, compared with $29.6 million for the previous year.

■

The Ultimate Corp. announced profits for the fiscal year ended April 30 were $10.1 million, or $1.04 per share, compared with $4.6 million, or 50 cents per share, for the same period last year. Revenues were $70.7 million, compared with $39.2 million for the previous year.

For the fourth quarter ended April 30, profits were $3.3 million, or 34 cents per share, compared with $1.4 million, or 15 cents per share, for the previous year.

■

Icot Corp. reported a net loss for the third quarter of fiscal 1984 of $570,000, compared with a net loss of $1.9 million for the same period a year earlier. Revenues were $5.1 million, compared with $3.4 million for the previous year.

■

Quantum Corp. announced revenues for the fiscal year ended March 31 were $10.6 million, a 61% increase over $41.7 million for the previous year. Profits were $10.6 million, or $1.12 per share, compared with $7.8 million, or 96 cents per share, one year earlier.

In the fourth quarter ended March 31, revenues were $21.9 million, an 85% increase over last year's $11.8 million. Profits were $3.2 million, or 34 cents per share, compared with $2.2 million, or 24 cents per share, in the previous year.

■

Eagle Computer, Inc. announced a net loss for the third quarter ended March 31 of $9.8 million, or 67 cents per share, compared with profits of $767,000, or six cents per share, for the previous year.

Revenues for the quarter were $10 million, virtually identical to the same period in 1983.

■

Sanders Associates, Inc. reported revenues for third quarter ended April 27 increased 25% to $192 million, compared with $153.3 million a year ago. Profits from continuing operations rose 25% to $13.7 million, compared with $10.9 million last year.

■

AM International, Inc. reported a 34% improvement in profits for the three months ended April 28 of $5 million, including an extraordinary item of $2.1 million. Profits for the quarter were $5.1 million, or 49 cents per share, compared with $3.2 million, or 31 cents per share, one year ago. Revenues were $153.7 million, compared with $142.3 million one year earlier. The company has been operating under Chapter 11 of the Federal Bankruptcy Act and recently filed a reorganization plan.

■

Western Micro Technology, Inc. reported profits for the fourth quarter increased 279%, reaching $648,000, or 26 cents per share, compared with $171,000, or 12 cents per share, one year earlier. Revenues were $13.4 million, compared with $4.8 million one year ago.

■

Magnetic Controls Co. announced that although revenues increased by 14% during the second quarter of fiscal 1984 to $20.5 million from $17.9 million one year ago, profits from continuing operations declined 43% to $724,000, or 13 cents per share, from $1.2 million, or 22 cents per share in the same quarter of 1983.

■

MSI Data Corp. reported a 19% increase in profits for the fiscal year ended March 31 to $4 million, or $1.63 per share, compared with $3.4 million, or $1.38 per share, in the prior year. Revenue totaled $61.1 million, compared with $58.6 million one year ago.

For the fourth quarter ended March 31, profits were $884,000, or 35 cents per share, vs. $142,000, or five cents per share, in the previous year.

■

Bolt Beranek and Newman, Inc. announced completion of the sale of the units of a $3.2 million R&D limited partnership. Proceeds will be used to develop an expert-system-based software package called BS/expert.

■

Wallace Computer Services reported profits for the third quarter ended April 30 of $5.3 million, or 55 cents per share, compared with $4.5 million, or 47 cents per share, one year ago. Revenues were $64.5 million, 18% higher than the comparable period for fiscal 1983.

A CIT-467 changes the whole way your graphics look

The CIT-467 is the quickest, easiest way we know of to get into color without getting into heavy expense.

You can have color for your business graphics, presentation graphics, scientific graphics, because the CIT-467 gives you a built-in color command set. It turns monochromatic Tektronix® 4010/4014 graphics into full color, without time and money consuming software changes and headaches.

The CIT-467 is fully compatible with PLOT 10,™ DISSPLA,® DI3000/GRAFMAKER® and other major graphics packages.

In terms of quality, the CIT-467 will meet anyone's terms. The dot resolution is a sharp 572 x 480. The Addressable Plot Area in the Tektronix mode is 4096 x 4096.

The CIT-467 gives you point, vector, polygon, circle and pie segments *on command* to reduce communications time, cut CPU overhead and save program development time.

You get user-defined area fills, five line types and built-in cross hair cursor.

Special plot features include a programmable scale factor for vector size and relocatable origin, allowing for simulated pan and zoom.

The CIT-467 is a total color graphics terminal. It's everything you need to give your present graphics software colorful new life.

We'd be happy to tell you much more about it and exactly how much less it can cost you to get into color with the reliable CIT-467. Just write or call.

CIE Terminals, 2505 McCabe Way, Irvine, CA 92714-6297 (714) 660-1421. Or call toll free 1-800-854-5959. In California, call 1-800-432-3687.

without changing your software.

CIE TERMINALS
A CROIX ELECTRONICS COMPANY

VLSI from page 86

be used in the units. Another feather in the firm's cap is its approval as an IBM value-added re-marketer for the units — an important service selling point. The company has venture capital backing from private investors and has secured a major line of credit from Bank of America.

Universal Semiconductor is an integrated-circuit manufacturer which also offers an IBM Personal Computer XT-based personal CAE workstation and access to a mainframe-based design service. This company claims to be able to simulate, verify, fabricate, test and deliver a prototype custom microchip in four to eight weeks from receipt of an end-user's input into the personal CAE workstation.

Cademic is another personal CAE workstation, design and fabrication services supplier. This company claims that its system is so easy to use that any engineer who understands digital logic will be able to create custom-integrated circuits after only a week of training.

Chancellor Computer also has an IBM Personal Computer-based CAE workstation with networking capability and plans to sell 20,000 units during the next five years.

Personal CAD Systems, CAD/Internet, Paragon Technology Corp. and Peritek Corp. are some of the other newcomers that also use IBM Personal Computers. As time progresses, there should be a mad scramble among microchip manufacturers to offer their custom-design services directly to the electronic engineers, which should provide a tremendous impetus to the personal CAE workstation market for some time to come.

LAW from page 90

a level of expertise far beyond that of their customers; and, like a doctor's patients and a lawyer's clients, computer users must often accept their vendor's judgment on faith alone. Hence, conclude advocates of this theory, vendors should likewise be subject to malpractice liability.

Other proposals include strict liability — liability for computer system malfunction without evidence of any wrongdoing on the part of the computer vendor — and the application to computer vendors of the Magnuson-Moss Warranty Act.

So far, these new theories of liability are merely proposals. But the courts are beginning to take notice of computer users' vulnerability.

Next week: Standardized contract clauses.

MSA-ADR from page 85

structure for the ADR/Datacom/DB versions of MSA's products. MSA's applications also operate with data base systems offered by other vendors, including IBM, Cullinet Software, Inc. and Cincom Systems, Inc.

According to ADR President Martin Goetz, another facet of the agreement provides for the two companies to market their software systems jointly in appropriate situations. Goetz explained that such situations would involve prospective customers looking to acquire full use of ADR/Datacom/DB, or what he described as a "complete data base and applications solution."

Under that arrangement, each company will market its own products, and customers will receive support and education from cross-trained MSA and ADR technicians.

Vohs said the ADR-MSA agreement calls for the companies to share information about their respective user communities — a move clearly intended to give each firm the opportunity to sell its products within the other's existing market base. MSA and ADR will also conduct joint seminars, public relations and advertising campaigns designed to promote the combined data base/applications system.

According to Vohs, the joint marketing agreement has been in force informally for nearly two years, but was not finalized until shortly before the announcement here June 12. MSA reportedly began developing applications for ADR's system software environment some 18 months ago.

ASL from page 85

stand what ASL was doing and didn't see the benefit being accrued."

Users and clients of ASL have differing opinions on the decision to disband the group. Roy Berglund, senior systems analyst for Phillip Morris, Inc., said, "I think Wang made quite a mistake by cutting away that segment."

Kavin Moody, director of systems planning and research for the Gillette Co. in Boston, is a member of the New England Office Automation Association, which was associated with Wang's ASL. Moody said the noncommercial nature of the ASL staff may have presented a dilemma for management.

Liam Clifford is information systems manager for the Irish Export Board (IEB) of Dublin, an independent government agency that promotes Irish exports. The IEB was asked to hear an ASL seminar on planning OA expansion. "We found it useful to have totally independent people with different approaches come in here and blow our minds open," Clifford said. "But their involvement made zero difference in the type of equipment we were going to buy."

Miller gave two reasons for the decision to divide ASL's functions between product development and marketing. First, he said, ASL was involved in both product design and development, but was not a part of either group. Secondly, the name "Advanced Systems Lab" implied that ASL was dealing with advanced systems, but Miller said the group was not marketing all of Wang's systems, such as the VS computer system.

COMPUTER INDUSTRY

MERGERS AND ACQUISITIONS

Dynax Corp. signed an agreement to invest $1 million in National Information Systems, Inc., Cupertino, Calif., for an undisclosed amount of stock. The investment will be used for the conversion of Accent R, National Information Systems' fourth-generation language and relational data base management system, from the Decsystem-10 and 20 to the VAX. Release of the VAX version is expected in late 1984.

■

Marine Management Systems, Inc., Stamford, Conn., announced capital investment by two London-based firms. United Newspapers, Inc. and clients of Montagu Investment Management Ltd. have taken an equity position in Marine Management Systems. Details of the transactions are not available.

■

Esprit Systems, Inc., Melville, N.Y., announced that it has signed a letter of intent with Digilog, Inc. and DBS International, Inc., to purchase DBS International (DBSI). Esprit will purchase all of the outstanding stock of DBSI for 250,000 shares of Esprit's common stock, to be issued at the transaction's closing, plus up to an additional 250,000 shares, to be issued by March 31, 1985, contingent on the level of sales of DBSI for the six-month period ending February 28, 1985, and the market price of Esprit's common stock on February 28, 1985.

The acquisition is subject to the completion by Esprit of a satisfactory review of the business of DBSI, final approval by the boards of Digilog and Esprit and execution of definitive agreements.

■

American Teleprocessing Corp., Houston, acquired Stockwatch of Houston, which will operate as a wholly owned subsidiary.

Stockwatch, established in January 1980, transmits real-time quotes from the New York Stock Exchange, American Stock Exchange, National Association of Securities Dealers Automated Quotations, Chicago Mercantile Exchange, Chicago Board of Trade, New York Commodity Exchange Center and Kansas City Board of Trade directly to microcomputers placed in client's offices or homes.

■

Rand Information Systems, Inc., San Francisco, announced it has acquired all the outstanding stock of Conversions, Inc., Raleigh, N.C., in a combination cash and Rand common stock transaction.

The total purchase price to be paid is based substantially on the future performance of the acquired company. Conversions will operate as a wholly owned subsidiary of Rand.

■

Analog Devices, Inc., Norwood, Mass., announced that an investor group led by the company's venture capital division, Analog Devices Enterprises, invested $4 million in Bipolar Integrated Technology, Inc. of Beaverton, Ore. Analog Devices invested $2.3 million, for which it received equity securities, giving the company a minority position in Bipolar Integrated Technology.

Joining Analog Devices were First Interstate Capital, Inc., First Capital Corp. and Adventures Limited Partnership.

BIG 8 from page 95

tion services business is with nonaudit clients, but conceded, "I don't think [the dispute] will be completely resolved."

But, he countered, "If you look at the public accounting profession, it is one of the most heavily regulated professions there are." Firms engaged in auditing practices are scrutinized by the Securities and Exchange Commission and by congressional committees and carry out severe self-regulation, he noted, adding, "We're continuously being put under the microscope."

While public accounting firms often are subject to litigation, "to the extent of our knowledge and anybody else's, we don't know of a single instance where the issue of conflict of interest has been raised," he claimed.

Hugh W. Ryan, associate director of data management for the firm, said that within the firm, "there is a tendency to separate the services; when an auditor looks at a system, it is not an Arthur Andersen system, it's just another client."

The firm's revenues from consulting and installation services are rapidly approaching $400 million annually, Levitan said, pointing out that the firm has been engaged in management consultation since its inception. Arthur Andersen claims to have initiated data processing consulting in 1952, when it helped General Electric Co. implement a payroll system on a Univac I computer.

The name Arthur Andersen may not be synonymous with DP, but the firm plans "very aggressive marketing" efforts to change that, according to Levitan. "Many in the business community don't know what we do or the extent of what we do," he said. With 6,000 professionals engaged in the practice on a worldwide scale, the firm believes it is in a unique position and has unique skills to offer in providing information services, he added. In a 1983 report to employees, the firm said it derived 27% of its revenues, or $328.9 million, from management information consulting.

A key to its efforts will be the reputation of the company, Levitan said. "Our best approach is through our reputation," he said, adding that the company takes full responsibility for its employees, who are mainly recruited straight out of college and undergo rigorous training.

Levitan said the firm sees three major areas to which it will direct its efforts: information for competitive advantage; reducing applications backlog through a systems approach to systems development; and integration of technologies developed for the office, DP, MIS and the factory. Levitan said the firm's goal is to bring together technologies "from robots to financial systems."

POSITION ANNOUNCEMENTS

Computer Sales Professionals...

Territories Available Nationwide

If you want to stop bumping your head on your income ceiling...

Harris Can Make It Happen.

Harris is a $1.8 billion Fortune 200 company at the cutting edge of communications and information processing. For more than a quarter century we envisioned the advent of the Information Age, and today are one of the few companies able to provide totally integrated communications and computer systems.

Harris Information Terminals Group manufactures a variety of IBM compatible products including distributed data processing systems, interactive terminal systems and remote batch terminal systems. Here you'll find an atmosphere where an entrepreneurial spirit and technical excellence work in harmony.

We recognize that our continued success, in large part, is predicated on our ability to attract and retain outstanding sales talent. Consequently, we have developed a compensation package that affords you the opportunity to maximize your earnings capability right from the start. You'll receive a highly competitive base salary, a lucrative incentive program as well as the full complement of company paid benefits and expenses that you'd expect from a major industry leader. What you won't find at Harris is any ceiling on your commissions. In fact, your income will be limited only by your ability to produce.

The equipment you'll be selling has varying sales and payment cycles, so while you're working on big ticket orders, you'll be able to balance your income with a range of products with relatively short sales cycles.

If you have a proven track record in computer and/or computer peripheral sales, and are looking for a highly professional environment where you can maximize your income potential, we invite you to consider the following opportunities:

If you are unable to call, please forward your resume in confidence to: Mr. Joe Preston, Director National Sales Recruiting, Harris Corporation, Information Terminals Group, 16001 Dallas Parkway, P.O. Box 809022, Dallas, Texas 75380-9022

BALTIMORE, PHILADELPHIA, WASHINGTON D.C.
(Federal and Commercial)
CALL COLLECT (703) 448-5400:
Mr. George Bernardini, District Manager

NEW YORK CITY, NORTHERN NEW JERSEY
CALL COLLECT (201) 994-2020:
Mr. Anthony Fusarelli, District Manager

CHICAGO, DETROIT, KANSAS CITY, MINNEAPOLIS and ST. LOUIS
CALL 1-800-245-0248:
Mr. Wayne St. Clair, Regional Director

DENVER, SAN FRANCISCO, LOS ANGELES, PHOENIX, PORTLAND and SEATTLE
CALL COLLECT (303) 799-8600:
Mr. Doug Wahl, District Manager

ATLANTA, DALLAS and HOUSTON
CALL COLLECT (214) 248-3265:
Mr. Van Adamson, Regional Director

We are an equal opportunity employer M/F/H/V

HARRIS

IF IT'S HAPPENING IN INFORMATION TECHNOLOGY, IT'S HAPPENING AT HARRIS.

IBM SYSTEM/38 PROGRAMMER ANALYSTS

Want to live in the beautiful mile-hi city of Denver, a fast growing high tech capital? If you qualify as an IBM System Analyst, we would like to hear from you.

First Trust Corporation, one of the nation's largest retirement plan trustees, is seeking two experienced S/38 programmers/analysts. We offer a challenging and profitable career opportunity to those seeking a unique niche in the burgeoning retirement plan industry.

We require a candidate to have at least one year's experience on the S/38, a stable work history and a team approach as well as very strong oral and written communication skills for multi-departmental interface.

If you have the required credentials, and are enthusiastic about learning new functions, contact First Trust. We offer a competitive starting salary based on experience, and a complete benefit package.

To match your needs with those of an established corporation with an outstanding growth history, send your resume to:

FIRST TRUST CORP.
444 Sherman Street
Denver, CO 80203

DP POSITIONS SEATTLE/PORTLAND

MVS, Sr. Systems Programmer $40K
Sr. IMS Systems Prog. 40K
Systems Performance data base consultant to applications group.
Sr. Programmer/Analyst 30K
Financial app. COBOL/1 on line interactive.
Programmer/Analyst 26K
COBOL1 or VSAM on-line dev.
Sr. PIA IMS applications dev ..... to 40K
Data Admin. Analyst ..... to 40K
data resources digest local DP design.
Please forward resume immediately to:
HOUSER, MARTIN MORRIS & ASSOC.
(206) 453-2700
C-98215, 7040-116th Ave. N.E.
Bellevue, WA 98009

HOW TO MAKE OVER $80,000.00 A YEAR ON CICS COMMAND LEVEL PROGRAMMING

Acquire one of the most demanded & rewarding programming skills in months. A complete & practical guide to CICS command level programming. It's based on CICS latest version 1.6, examples are written in COBOL, with special emphasis on VSAM. It covers virtually every CICS technique you'll ever need.

15 sample programs address all CICS major technical applications. Over 150 ready-to-use examples. Hardson mylar-coating covers, contents printed in two colors. Brand-new second edition. Big 8.5" x 11" size. Over 7000 copies have been sold during the last 10 months. Written by top-notch CICS consultant in the country. Designed to cut your learning curve at least in half. Also tips on moonlighting and contracting on CICS projects.

You must be satisfied or your money back, no matter how long you've had it. But act now! Send $34.95 (plus $2.00 for P & H) in check or M.O. (Visa & M/C Welcome) to:

CCO Online Systems, Inc.
6313 Crested Butte Drive
Dallas, TX 75252

(Allow 1 or 2 weeks for delivery)

EXPERIENCED SYSTEMS PROGRAMMERS, ANALYSTS AND PROGRAMMER ANALYSTS FOR SUNBELT LOCATIONS

Job dissatisfaction, complacency, and frustration are the biggest obstacles to overcome to achieve one's career goals. Everyday new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the market place. Absolutely no obligations, please call or write Keith Reichle, CPC, Data Processing Specialist.

Dunhill
OF CHARLOTTE, INC.
6401 Carmel Road, Suite 107
Charlotte, North Carolina 28226
800-438-2012
(NC Call)
(704) 542-0312

DATA PROCESSING
Supervisor of Applications Programming

Sundstrand Heat Transfer, a major producer of heat transfer products, has an opportunity for an individual to join a progressive company working with state-of-the-art hardware systems.

The person we are seeking will become involved with implementing a comprehensive manufacturing system (COPICS) as well as integrating it with all other automated systems.

It is important that this person be experienced in CICS, TSO, and COBOL, as well as with manufacturing process systems. This position would provide the ideal opportunity for a systems analyst or project leader who is interested in professional growth.

This Sundstrand facility is located in a resort area of southwestern Michigan, and would appeal to those enjoying outdoor recreational activities and a relaxed lifestyle. However, the area is near several large cities which provide cultural opportunities.

As a diversified industry leader, Sundstrand offers challenging career opportunities, and an outstanding compensation and benefits package which includes housing assistance and relocation.

Interested candidates should send their resume and salary requirements to:

Steve Aylsworth
Sundstrand Heat Transfer, Inc.
415 E. Prairie Roads Street
Dowagiac, MI 49047
An Equal Opportunity Employer

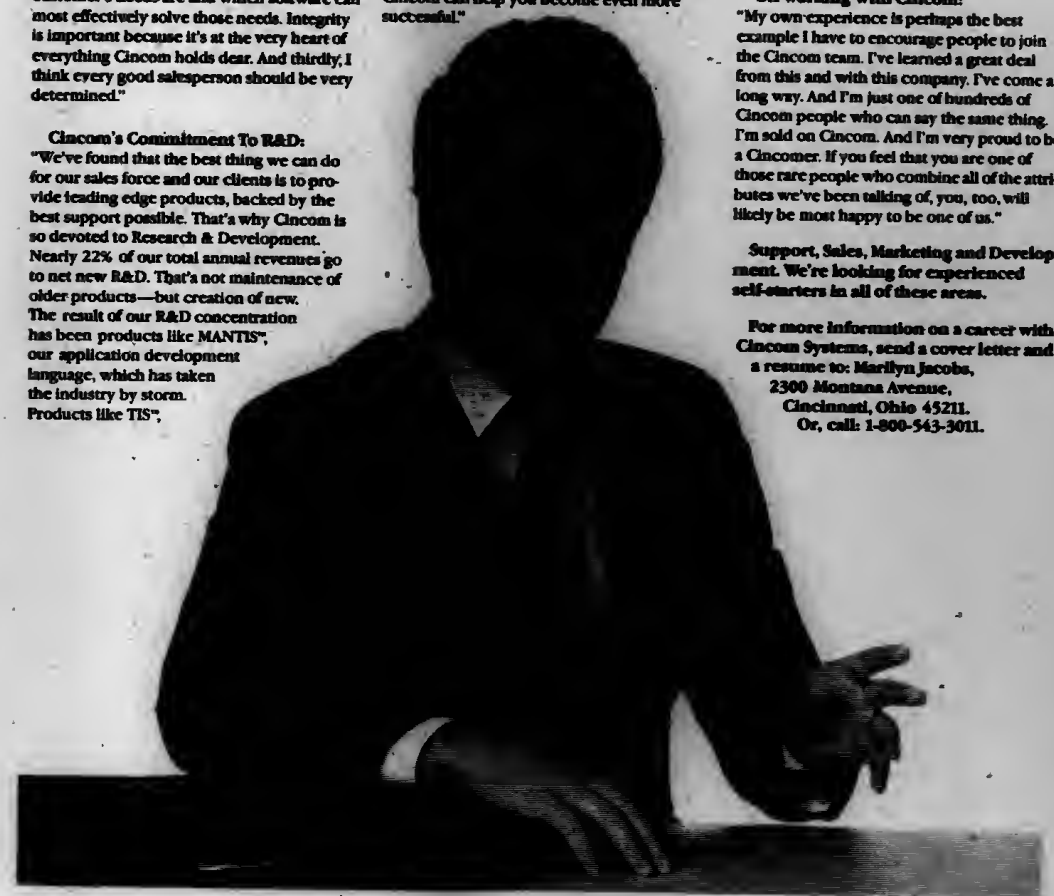
"Sold On Cincom."

British born Steve Rudlin, like many Cincomers, is truly an international software salesperson. His career with Cincom Systems has taken him to Australia, New Zealand, and the United States. Steve is currently Manager of Cincom's Eastern U.S. Region. From a recent interview, here are Steve's thoughts on Cincom's approach to software sales and what he looks for in recruiting software salespeople.

Important Software Selling Traits:
"Three of the most important traits I look for in sales candidates are perception, integrity, and determination. Perception gives a salesperson the ability to understand what the customer's needs are and which software can most effectively solve those needs. Integrity is important because it's at the very heart of everything Cincom holds dear. And thirdly, I think every good salesperson should be very determined."

Cincom's Commitment To R&D:
"We've found that the best thing we can do for our sales force and our clients is to provide leading edge products, backed by the best support possible. That's why Cincom is so devoted to Research & Development. Nearly 22% of our total annual revenues go to net new R&D. That's not maintenance of older products—but creation of new. The result of our R&D concentration has been products like MANTIS™, our application development language, which has taken the industry by storm. Products like TIS™, ULTRA INTERACTIVE DATA BASE SYSTEM™, MRP5, and our new MANAGE USER SERIES™ are also gaining an international reputation as some of the best software systems of their kind."

Selling For A Full Service Vendor:
"Along with R&D every Cincom salesperson is backed up by a comprehensive software support commitment. Cincom salespeople can, with confidence, guarantee things like support, service and user education and never worry about the commitment of the people and the company behind these promises. In essence, working with Cincom makes it easier to become a successful salesperson. And if you are already successful, Cincom can help you become even more successful."



Outstanding Rewards For Outstanding Performance:
"Cincom has no ceiling on the income our sales people can earn. We ask a lot—and we provide a lot. So, when an individual performs in an outstanding manner they are rewarded very well. The success factor among Cincom salespeople is very high. They are motivated and their contributions are well appreciated."

On Software Excellence:
"Software is a people product. The better one's people, the better one's software. This is why we go to such great lengths to find the most talented and the most achievement-oriented people available."

On Working With Cincom:
"My own experience is perhaps the best example I have to encourage people to join the Cincom team. I've learned a great deal from this and with this company. I've come a long way. And I'm just one of hundreds of Cincom people who can say the same thing. I'm sold on Cincom. And I'm very proud to be a Cincomer. If you feel that you are one of those rare people who combine all of the attributes we've been talking of, you, too, will likely be most happy to be one of us."

Support, Sales, Marketing and Development. We're looking for experienced self-starters in all of these areas.

For more information on a career with Cincom Systems, send a cover letter and a resume to: Marilyn Jacobs, 2300 Montana Avenue, Cincinnati, Ohio 45211. Or, call: 1-800-543-3011.

An Equal Opportunity Employer

Cincom Systems

Excellence in Software Technology.

...Talk directly to our technical managers from the convenience of your own telephone.

PRESENTING THE INSTANT CAREER INTERVIEW!

WEDNESDAY & THURSDAY
June 27th & 28th 6:00 pm - 9:00 pm
CALL COLLECT

We know your time is important. Now, you can learn about career opportunities at Dynamic Control without leaving your home. Our technical managers will be available after hours to talk with you about your talents and how you might become a part of our organization. We are a division of a Fortune 500 NYSE Company and have become one of the nation's leaders in developing software systems for the healthcare industry. We currently have positions available in Orlando, Florida; Bethesda, Maryland and Chicago.

PROGRAMMERS/PROGRAMMER ANALYSTS
IBM System 38
ORLANDO • BETHESDA • CHICAGO

We are seeking programmers experienced in coding RPG II on System 3, System 34 or RPG III on System 38 in an interactive on-line environment or individuals with experience in CADOL on CADO Systems. Two-three years programming experience required.

Market recognition has greatly increased our volume and our need for experienced systems professionals. We are actively recruiting for our Pharmacy, Development, Implementations and Customer Support areas.

SYSTEM/38 PROGRAMMERS
BETHESDA

The individuals selected will be based in our Bethesda location and will have the opportunity to travel to client sites throughout the nation. Good communication skills, a minimum of two years of S/34 and/or S/38 programming experience in an interactive environment will qualify you to join our elite team of S/38 professionals.

SYSTEM/38 PROGRAMMER ANALYSTS
CHICAGO

We are currently seeking experienced Programmer Analysts to join the staff in our Chicago location. Responsibilities will include design, modification and installation of RPG III code in a healthcare environment on the IBM S/38 and will ultimately involve managerial responsibilities within the Chicago area. A minimum of 4-5 years RPG II on S/34 and/or 2+ years RPG III on S/38 in an interactive on-line environment is required. Hospital experience desirable.

Dynamic Control is a people-intensive organization. In accordance, we offer an excellent salary, complete benefits including: medical, dental, profit sharing, the opportunity for national and international travel, liberal vacation time and RELOCATION ASSISTANCE. To find out more about these career opportunities call our technical managers at the location you are interested in: Orlando - 1-800-[illegible]; Bethesda call collect 301-[illegible]; and Chicago call John Miller collect at 312-[illegible]. If you are unable to call, write us an informal letter or submit a resume outlining your qualifications. Personnel Department, 307 E. Semoran Springs Drive, Longwood, FL 32750-5197.

Dynamic Control
A division of Travenol Laboratories, Inc
An Equal Opportunity Employer M/F

Director of Systems and Technical Support

Bachelor's degree and 5-7 years experience including minimum 3 years in a management position related to the development and technical support of application systems in a DEC/VAX/VMS environment. This new position will report to the Vice President and will be responsible for all design, programming, support and technical support for a national center complex of 3 VAX systems as well as a field system planned for growth to over 100 locations.

Strong administrative and procedural skills a must to organize and effectively direct the 10 staff assigned to this area. Minimal travel. Salary to mid $40's and paid relocation for the right candidate.

Programmer/Analyst (6 Positions)

Bachelor's degree in math or computer science and 2-4 years experience in programming business applications or some combination of education and experience. COBOL or Basic and DEC/VAX experience is required. Salary mid to high $20's negotiable on the basis of qualifications and skills, and paid relocation.

Comprehensive and desirable benefits include medical/dental/life, tax shelters and health club. Direct resume to the Senior Employment Representative.

The American Heart Association
Corporate Headquarters
7320 Greenville Avenue
Dallas, Texas 75231
Non-Smoking Environment
Equal Opportunity Employer

COMPUTER PROFESSIONALS

Help us build the foundation for tommorrow's software

Foundation Computer Systems ALLY™ project team has immediate openings for senior systems developers and for a manager of software quality assurance. And our language development group has openings for compiler developers.

ALLY is a fourth-generation software development environment. It integrates an easy-to-use application development system with a powerful window-oriented screen management system. ALLY is written in the C language and runs on many operating and database management systems. Several major computer manufacturers have purchased ALLY licenses.

Foundation offers the best of two worlds: a fast-moving, small-company atmosphere along with big-company benefits, rewards and security. Cary, NC is adjacent to the Research Triangle Park and three major universities. This area is rated among the best places to live in the United States.

Senior Systems Developers
We have openings for two skilled senior-level systems developers. One developer will help us implement and enhance our ALLY products. You must have a strong background in systems programming using Unix™ and C. The other person will be responsible for porting ALLY to the IBM mainframe environment. You must have experience with C, Unix, and VM/CMS.

Software Quality Assurance Manager
This is a unique opportunity to structure, staff and manage your own software quality assurance group. You will use your strong background in quality assurance to establish the group's policies and procedures.

Compiler Developers
You will use your experience in all phases of compiler development to build compilers for a new computer system. The languages include C, COBOL, Pascal, FORTRAN and BASIC.

To apply for one of these positions, send your resume to:

Foundation Computer Systems
975 Walnut Street
Cary, NC 27511

Equal opportunity employer

ALLY is a trademark of Foundation Computer Systems.
Unix is a trademark of AT&T Bell Laboratories.

Foundation

DIRECTOR OF COMPUTER SERVICES
$30,402 - $40,[illegible]

The City of Highland Park, Illinois, is accepting applications for a Director of Computer Services. The Director is the head of the Computer Services Department and reports to the City Manager. The city currently operates 3 minicomputer systems at 2 sites. Near term plans call for expanding to 57 terminals located throughout the city and the installation of an electronic cash register. A broadband local area network connecting 37 buildings, a relational database management system, and laser printer are in place. The successful applicant will have a minimum of a B.S. in computer science or closely related field (M.S. preferred) and 5 years of experience in developing business applications, at least 2 years of which will have been at the project leader level. Preference will be given to applicants with VAX/VMS experience, and/or Oracle DBMS experience. Interested persons should apply by July 13, 1984 to:

Personnel Office
City of Highland Park
1707 St. Johns Avenue
Highland Park, IL 60035
Phone: (312) 432-[illegible]

We are an affirmative action/equal opportunity employer.

Computer

PROGRAMMERS
ANALYSTS
PROJECT LEADERS
SYSTEMS ADMINISTRATORS
OPERATORS

We offer:

- Flex Time
- Very Competitive Salaries
- Excellent Benefits
- Growth Opportunities
- Washington DC Location

We are:

- Growing Fast
- Building An In-House Staff
- Upgrading

We need:

- Goal Oriented People
- Honeywell Level 6, GCOS 6, TOS 6 Experience, a plus

Please send your resume, including salary history, today to:

MANAGER, HUMAN RESOURCES
HOME OWNERS WARRANTY CORP.
2000 L STREET NW
WASHINGTON, DC 20036
Principals Only EOE M/F/H/V

1000 SUNBELT OPENINGS

D.P. - ROBERT MONTGOMERY

Prog. Anal. (3 plus yrs. mfg. CICS & COBOL)	TO: $32,000 NC location
Sys. Prog. (3 plus yrs. MVS or IMS)	TO: $40,000 SC location
Prog. Anal. (3 plus yrs. banking IMS & COBOL)	TO: $32,000 VA location
Sys. Prog. (3 plus yrs. NCP & VTAM)	TO: $40,000 NC location
Sys. Anal. (3 plus yrs. ins. appl. & COBOL)	TO: $37,000 TN location
Prog. Anal. (3 yrs. H-P & COBOL)	TO: $28,000 NC location

ENGINEERING - MIKE HUNTER

Sys. Mgrs. - [illegible]	TO: $70,000
Sys. Engrs. - Micro/Op. Sys.	TO: $50,000
Sr. Software Engr. - VAX/VMS	TO: $42,000
Software Engrs. - [illegible]	TO: $45,000
Software Engrs. - Telephony	TO: $50,000

Fox-Morris is the nation's largest corporate owned co. with over 100 affiliates located throughout the nation. For a clear understanding of our clients needs call 919/[illegible] or send resume to:

FOX-MORRIS ASSOCIATES [illegible]

NEW ENGLAND EDP OPPORTUNITIES

Outstanding opportunities exist in New England for Project Leaders, Systems Programmers, Systems Analysts, Programmer Analysts, Software Engineers with two plus years experience.

Experience "quality of life" while achieving your career goals. Call or write today in total confidence.

KUEBLER ASSOCIATES
Data Processing Division
Executive Office Center
Two Monument Square
Portland, ME 04101
(207) 774-[illegible]

THE UNIVERSITY OF AUCKLAND
New Zealand
DEPARTMENT OF MANAGEMENT STUDIES

AN ASSOCIATE-PROFESSORSHIP IN INFORMATION SYSTEMS

Applicants should have a strong record of teaching and research experience, with interests in two or more of the following fields: Systems Analysis, Systems Design, Programming, Data Base Management Systems, Data Communications, Management Information Systems, and Decision Support Systems. Preference will be given to those who are able to demonstrate practical experience in any of these areas. It is expected the person appointed will play a leading role in the development of teaching and research programmes in Information Systems and Commercial Data Processing.

A LECTURESHIP/SENIOR LECTURESHIP IN INFORMATION SYSTEMS

Applicants should have a higher degree and have teaching experience and research interests in two or more of the following fields: Systems Analysis, Systems Design, Programming, Data Base Management Systems, Data Communications, Management Information Systems, Decision Support. Preference will be given to those who are able to demonstrate practical experience in any of these areas.

Commencing salaries will be established within the appropriate scale. Present salary scales are: for an Associate Professor $NZ[illegible] per annum; Senior Lecturers $NZ[illegible]-$39,127 per annum; and Lecturers $NZ21,[illegible] - [illegible] per annum. Salaries are currently supplemented by an [illegible] per week cost-of-living allowance. Conditions of Appointment and Method of Application are available from the Assistant Registrar (Academic Appointments), University of Auckland, Private Bag, Auckland, New Zealand. Applications in accordance with the Method of Application should be forwarded as soon as possible but not later than 31 AUGUST 1984.

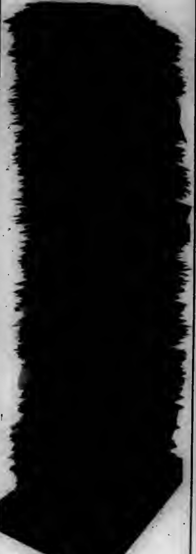
AMHERST COLLEGE
NETWORK MANAGER

Amherst College is installing a broadband cable network for campus-wide data communications. The College invites applications and nominations for the new position of Network Manager. The Network Manager will be responsible for the day-to-day operation of the network. He/she must understand the basic theory of broadband cable communications and be competent to evaluate software for interfacing with the cable. Inasmuch as the Network Manager will be dealing with many people from throughout the College in the implementation of an unfamiliar technology, his/her technical knowledge and skills must be matched with patience and an ability to communicate clearly and easily.

Candidates should have a bachelor's degree in Computer Science or an equivalent background with relevant experience. Nominations and resumes should be sent to Professor Duane W. Bailey, Department of Mathematics, Amherst College, Amherst, Massachusetts 01002 before July 15, 1984. All inquiries will be acknowledged.

AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER.

If You're Worried About Getting Lost In This...



...Try This.

CARI: Computer Assisted Recruitment International

CARI DOES IT FAST – HERE'S HOW CARI is a cooperative effort with General Electric Information Services. Utilizing their teleprocessing network, CARI puts your qualifications in front of America's top corporations. CARI enters your Candidate Profile into the CARI System. Then, it is available to employers nationally. Employers with key positions enter their specific job requirements into the CARI System. When the job calls for the qualifications you possess, you get the call – directly from the employer.

TRUST CARI TO KEEP IT CONFIDENTIAL CARI automatically screens your present employer and parent company from seeing your name and profile.

WHAT'S MORE – IT'S FREE CARI performs this valuable service for you, for absolutely nothing. CARI's corporate clients assume the modest cost.

Major multi-national companies are expanding and diversifying with strong demands for innovative systems, engineering and sales professionals to LEAD IN THE DEVELOPMENT OF 4TH GENERATION TECHNOLOGIES in computer related products and fields. Desirable locations in the U.S. and throughout the world.

A Better Approach For A Better Career

Here are some of the positions in high tech electronics and EDP that are currently available with our corporate clients.

Software Engineers Positions require a BSCS or EE and a minimum of 2 years experience. Real-time TF/TA software, PASCAL, C, ADA, Jovial and assembly language. Advanced Signal Processing. Parametric definition, time/memory tradeoffs and real-time codes, VAX running VMS procedure development, test systems and real-time communications software, design coding and test of real-time imbedded guidance systems, configuration management, array processors and other target microengines, systems programming including hardware description languages, resistor transfer languages and other CAD tools, development of VHSIC hardware descriptor language.

VLSI IC Design Engineer Multi-chip VLSI design, bar mapping simulation, logic design, layout and photomasking. +5 yrs. exp. BSEE.

Circuit Design Engineer CMOS ICs including advanced CMOS gate arrays, +5 yrs. exp. BSEE.

Programmer Analysts Challenging applications in accounting, finance, distribution, inventory management – 2 years MICRO-DATA OR PICK OS experience with DB 6 a plus.

Programmers Variety of applications across all disciplines. Requires 2 years MACRO PDP11 and ASSEMBLER experience.

Digital Circuit Design Engineers Design, breadboard, and test advanced signal processors for radar, acoustic processing and MIL-SPEC applications. MSEE and four + years of experience.

Telecommunications Consultants Design and develop a telecommunications network in support the nationwide delivery of data processing and information services products. Five + years of experience in multi-phase telecommunication design and development. Knowledge of mini and micro computers desirable. Ability to consider business needs in multi design objectives. Marketing experience a +.

Systems Consultants – IBM SYS/34 Serve as Team Leader on multiple projects. Operations and product management in product definition and user requirements, research through implementation. Requirements: IBM SYS/34, RPG II, COBOL, CICS. DOS/VSE preferred.

Senior Technical Consultants Lead the design, development, testing and implementation of human resources, payroll and accounting products. Requirements: MICRO-DATA/PICK OS. HRIS, personnel, payroll, accounting applications a plus.

Electronics Engineers BS EE or CS. Systems design experience in Hardware, Firmware or Software. UNIX, C and ASSEMBLY are a +.

Senior Technical Consultants – TANDEM Heavy team environment in analyzing, designing and testing financial applications. Experience with: TANDEM/TAL, COBOL, SCOBOL, Financial Applications.

Systems/Technical Consultants Key resource in analyzing, developing and integrating user department systems. Experience with DEC VAX, 11/780, IBM 30XX, HP or similar minis, COBOL. User support experience a +.

Senior Systems/Technical Consultants Conduct research within operating departments and product management to identify needs, modifications, interfacing requirements – concept through implementation. Experience in business systems analysis, COBOL, ASSEMBLER, EASYTRIEVE.

Systems Analysts Requirements: COBOL, VSAM, TSO, JCL. ASSEMBLER and/or payroll experience a plus.

Computer Service Sales Initiate the introduction of new micro & mini based systems products and services. Requirements: 3 years commissioned sales experience in data processing systems/services or hardware, payroll, accounting, human resources product experience.

Customer Support Representatives – Computer Services Provide technical support to customers and marketing. Analyze customer hardware and software, develop alternatives, recommendations and solutions to unique situations. Requirements: one + years in data processing or equivalent education; experience with microcomputer-based solutions + technical service support. Applications background: payroll/personnel, marketing, accounting/finance.

CAD Engineering or System Design Software experience. FORTRAN, C, BSEE/MSEE or equal. 2 years industry experience. UNIX a +. VM/CMS plus UNIX in IBM, DEC environment. Database design. Knowledge of solid state devices, digital and analog IC's. BSEE or equal experience in ASSEMBLER, UNIX, C desired. Experience testing to wafer level microcode a plus.

Systems Manager VAX or equivalent. Mini operations experience. Provide direction to users. Build utilities and tools. BSCS or equivalent. VAX systems manager in UNIX environment. C and ASSEMBLY language code experience.

Senior Electronics Engineers Circuit design of computer based logic for tape and disk drive. 3 + years hardware logic design. 1 + years tape/disk experience.

Engineering Managers BSEE, 2 years management experience. Mainframe or minicomputer environment design experience.

Internal DP Consultants Minimum 3-5 years DP experience. Bachelor's degree and excellent communication/interpersonal skills are essential. Project management and software design experience desirable. Knowledge of any of the following areas highly desirable: COBOL, CICS, PL/1, FOCUS, and IMS.

Technical Programmer Support Network Control, activate and monitor on-line performance, circuit and equipment operation and supervise operators on a large network. Prefer 2 years experience operating a large network, knowledge of VTAM, CICS, 3705's, NCGE, NPDA and problem diagnosis/resolution. TSO and JCL a plus.

Technical Specialists Data base, data communications, telecommunications, minis, micros, systems software and application software technical skills required. Degree in Computer Science or Engineering and good interpersonal skills necessary.

Sr. Programmer Analyst Must have at least 3 years of BAL experience using IBM hardware in an OS environment. Heavy user contact.

Software Engineers Troubleshoot and debug on-line, batch and timesharing problems. 2 + years real time systems programming experience. Telecommunications experience a +. BSEE or BSCS.

Candidates, Call Weekdays, [illegible]

Employers, Call Weekdays, [illegible]

We'll send you more information and a CARI Candidate Profile Summary. Or Simply Return The Coupon Below.

Please send me a CARI Candidate Profile Summary. I've checked my professional area(s) below.

☐ ***Data Processing***
☐ ***Engineering***
☐ ***Sales/Marketing***

NAME

ADDRESS

CITY

STATE ***ZIP***

Return to: CARI, Dept. [illegible], [illegible] Woodfield Road, Schaumburg, IL [illegible].

CARI is a database and telecommunications service – NOT an employment agency.

*If the perfect job for you isn't listed here, it's not because we don't have the job, it's because we don't have the room. Call or send the coupon anyway.

CARI We want to help.

Computer Assisted Recruitment International, Inc.

FIELD ENGINEERS

Dataserv Computer Maintenance is expanding nationwide. We have immediate openings now!

These are key positions and provide excellent opportunities that could lead to further promotion in a fast growing company. We offer an excellent compensation plan and fringe benefits for experienced individuals. Your potential for personal advancement with our $130 million company is the greatest now as we expand.

Positions now available in:

Midwest Location - Field Engineer. Immediate opening for experienced Field Engineer for support of IBM 5520 Word Processing System.

Milwaukee, WI Area - Field Engineer. Immediate opening for experienced Field Engineer to maintain IBM 3651 Controllers and IBM 3663 Grocery Scanner Systems.

Chicago, IL - Field Engineer. Immediate opening for experienced Field Engineer for the support and maintenance of IBM large mainframe, 3033 CPU, terminals and all associated peripherals.

North Haven, CT - Field Engineer. Immediate opening for experienced Field Engineer to service and maintain IBM 327X terminal equipment.

New Hope, MN - Banking Equipment CE needed. Immediate opening for a Customer Engineer with experience on IBM 3890's. 1419 experience is desired but not a must.

Dataserv will have additional opportunities soon for experienced field engineers and technical specialists in major cities throughout the United States. If you're considering a change, contact Dataserv for a review of our company and your career goals.

For immediate confidential consideration call TOLL FREE - 800-328-6729 or send resume to: Bev Walters, Dataserv Computer Maintenance, Inc., P.O. Box 3003, Hopkins, MN 55343.

An equal opportunity employer.

dataserv

HONEYWELL DPS 66 GCOS

The nation's number one design firm has several career opportunities at our Regional Data Center located in Greenville, South Carolina.

Individuals selected will have 2 to 5 years experience (degree preferred) in:

- COBOL 74
- DM IV DATA BASE
- TRANSACTION PROCESSING

Excellent salary and comprehensive benefits. For immediate consideration, please forward your resume and salary requirements, in confidence, to:

PERSONNEL DEPARTMENT
CRS SIRRINE
POST OFFICE BOX 5456
GREENVILLE, S.C. 29606

CRSS
CRS SIRRINE

An Equal Opportunity Employer M/F

VICE PRESIDENT MARKETING

Software Subsidiary

M.B. Systems, Inc. is a newly formed subsidiary of the MILTON BRADLEY COMPANY, established to develop and market our own line of proprietary software products. Our small group has a ground floor opportunity for an executive to head-up all sales, marketing and business development activities for this start-up operation.

Reporting to the subsidiary President, you will have the prime sales responsibility and will personally present to top management of client companies. You will also be responsible for generating marketing plans, including advertising and promotional programs. In addition, you will need to have a thorough understanding of systems from main-frame to micro, and be capable of contributing to the creative process by identifying new product opportunities to be developed. A solid background in software sales and development is required.

If you feel well qualified for this exciting opportunity offering a highly competitive compensation arrangement and excellent benefits, please forward your resume (NO PHONE CALLS, PLEASE), including salary history to:

JAMES G. KERSHNER
Director, Employee Relations

MB MILTON BRADLEY

MILTON BRADLEY CO.
P.O. Box 3400
Springfield, Mass. 01101

an equal opportunity employer m/f

PHILADELPHIA

We have been retained to recruit exclusively for well-known Delaware-Maryland client undertaking extensive expansion. The resulting positions offer challenge, growth and advancement opptys. Top benefits and paid relocation. Our client seeks:

DATA ANALYST
TO $37,000
IDMS

Lge scale IBM teleprocessing, sound analysis/design skills & prior COBOL prgming. Reqs good user skills, gen-biz appls & IDMS exp.

SYSTEMS ANALYST
TO $34,000
M.S.A.

Lge scale IBM teleprocessing, sound analysis/design skills & prior COBOL prgming. Reqs in-depth MSA exp, good user skills & sound payroll knldg.

PROG/ANALYST
TO $30,000
SYS/38-RPG III

SYS/38, RPG III pro with fin'l & mfg appls. Analysis/design & good user skills plus MAPICS +.

ROBERT HALF
OF PHILADELPHIA, INC.
2000 Market St., Suite 795
Philadelphia, PA 19103
(215) 568-4580

FLORIDA

DATABASE ADMINISTRATORS (2)......To $47,000

A high quality, people-oriented firm with new data center in Central Florida is currently expanding its MIS staff to develop online IMS database systems. They seek 2 DBA's who have worked with database design, database utilities, problem resolution, file management, IMS tuning, performance evaluation, etc. Excellent firm, exciting environment, exceptional growth potential.

MVS SYSTEMS PROGRAMMERS ....To $46,000

Rapidly expanding hardware mfr. seeks individuals with solid exp. installing, maintaining and tuning MVS systems software. Pluses would include CICS, TSO, CMS, IDMS. Good opportunity for someone creative.

If you would like information on either of these career opportunities or have an interest in the Florida marketplace, please call or send resume/letter to:

JARVIS-WALKER

4919 Memorial Highway
Tampa, Florida 33614
(813) 884-4448

FLORIDA

VM/MVS SYSTEMS PROGRAMMERS to $30's
Multiple openings including a new installation where you will manage the complete operation.

HOGAN - ALL LEVELS to $40's
Various opportunities throughout the Southeast for experienced Programmers, Sr. P/A's and Project Leaders.

HP3000 WITH ASK and IMAGE High $30's
Large manufacturer with a stable growth history requires MANMAN EXPERIENCE.

IMS DB/DC and PL/1 High $30's
Tremendous demand for experienced applications and DBA people.

Many opportunities await you in the Southeast. For further info on these and other openings, call or write: Dave Mitchell at:

FRANK LEONARD PERSONNEL
1211 N. Westshore Blvd.
Tampa, FL 33607
(813) 872-1083

An Equal Opportunity Employer M/F
Client Company Pays All Fees

COMPUTER PROGRAMMER

Computer Programmer needed to convert symbolic statement of business problems to detailed logical flow charts for coding into computer language. Debug programs as errors are revealed. Discuss test requirements to insure proper machine utilization. Observe or operate computer to test coded programs. Requires a bachelors degree in computer science. Must have knowledge of BASIC and COBOL languages. Must have working knowledge of botany and chemistry. Must be available for travel and overtime as required. 40 hour work week. $18,000 per year. Apply at Texas Employment Commission, Lubbock, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, TX 78778. Job order number 3461577. Ad paid by an equal employment opportunity employer.

TANDEM TAL

PROGRAMMERS
Florida Location

Immediate hires. All fees including interviewing and relocation expenses paid by client company.

Call 904-725-0067

Or send resume to:

KELLY DAVIDSON
P.O. Box 19141
Jacksonville, FL 32245-9141

Advanced Recruiters INC.

SYSTEMS MANAGER

(4381/VAX)

Failure Analysis Associates (FaAA) is a Palo Alto-based engineering consulting firm with offices nationwide. FaAA specializes in in-depth multi-disciplinary engineering failure diagnosis and analysis problems.

FaAA seeks an experienced IBM/VAX Systems Manager for our newly-expanded computer center, which includes a newly installed IBM 4381 as well as a VAX 780 and 750. The ideal candidate must have in-depth experience with IBM VM/CMS, knowledge of IBM 43XX systems; experience with VAX equipment a plus. In addition, the person should be engineering-oriented, a talented programmer, have a background in handling large data bases, and experience supervising systems or applications programmers. Reporting to the President, the person will be responsible for the overall technical direction of the FaAA computer center. Excellent oral and written communications skills and the ability to interact well with users is necessary.

FaAA offers an outstanding benefits package and salary commensurate with background and experience.

Please send resume and salary requirements to:

Failure Analysis Associates
P.O. Box 51470
Palo Alto, California 94303
Attention: N. Meyer

Call today

Call the Source Edp office nearest you for a free copy of our Digest of Computer Opportunities. We'll mail a copy to you in strict confidence, without obligation.

If unable to call, write:

Source Edp
Department CD2
P.O. Box 7100
Mountain View, CA 94039

When writing, please include your title.

Alabama
Birmingham 205/322-8745

Arizona
Phoenix 602/279-1010
Tucson 602/792-0375

California
Northern
Mountain View 415/969-4910
Sacramento 916/446-3470
San Francisco 415/434-2410
Walnut Creek 415/945-1910
Southern
Fullerton 714/738-1313
Irvine 714/833-1730
Los Angeles/
Downtown 213/688-0041
Los Angeles/
South Bay 213/540-7500
Los Angeles/West 213/203-8111
San Diego 619/231-1900
San Fernando Valley 818/781-4800

Colorado
Denver 303/773-3700

Connecticut
Danbury 203-797-0590
Hartford 203/522-6590
New Haven 203/787-4595
Stamford 203/967-4888
Stratford 203/375-7240
Waterbury 203/574-5633

District of Columbia
Washington D.C. 202/293-9255

Florida
Fort Lauderdale 305/491-0145
Jacksonville 904/356-1820
Miami 305/624-3536

Georgia
Atlanta/Downtown 404/588-9350
Atlanta/North 404/953-0200

Illinois
Chicago/E. Loop 312/565-1400
Chicago/W. Loop 312/346-1280
Oak Brook 312/986-0422
Rolling Meadows 312/392-0244

Indiana
Fort Wayne 219/432-7333
Indianapolis 317/631-2900

Iowa
Des Moines 515/243-0191

Kansas
Overland Park 913/888-8885
Wichita 316/688-1621

Kentucky
Louisville 502/581-9900

Louisiana
Baton Rouge 504/924-7183
New Orleans 504/561-6000

Maryland
Baltimore 301/727-4050
Greenbelt 301/441-8700
Towson 301/321-7044

Massachusetts
Boston 617/482-7613
Burlington 617/273-5160
Springfield 413/739-4083
Wellesley 617/237-3120

Michigan
Detroit 313/259-7607
Grand Rapids 616/459-6539
Lansing 517/484-4561
Southfield 313/352-6520
Troy 313/362-0070

Minnesota
Minneapolis/West 612/544-3600
Downtown 612/332-6460
St. Paul 612/227-6100

Missouri
Kansas City 816/474-3393
St. Louis 314/862-3800

Nebraska
Omaha 402/346-0709

New Hampshire
Nashua 603/880-4047

New Jersey
Cherry Hill 609/482-2600
Edison 201/494-2800
Morristown 201/267-3222
Paramus 201/845-3900
Princeton 609/452-7277
Somerset 201/469-9444
Somerville 201/526-9658

New Mexico
Albuquerque 505/247-4270

New York
Albany 518/482-2035
Buffalo 716/835-9630

New York City
Grand Central 212/557-8611
Penn Station 212/736-7445
Wall Street 212/962-8000
Rochester 716/263-2670
Syosset, L.I. 516/364-0900
Syracuse 315/422-2411
White Plains 914/694-4400

North Carolina
Charlotte 704/552-6577
Greensboro 919/379-1155
Raleigh 919/847-7605
Winston-Salem 919/724-0630

Ohio
Akron 216/535-1150
Cincinnati 513/769-5080
Cleveland 216/771-2070
Columbus 614/224-0660
Dayton 513/461-4660
Toledo 419/242-2601

Oklahoma
Oklahoma City 405/722-7410
Tulsa 918/599-7700

Oregon
Portland 503/223-6160

Pennsylvania
King of Prussia 215/265-7250
Philadelphia 215/665-1717
Pittsburgh 412/261-6540

Rhode Island
Providence 401/751-0065

South Carolina
Columbia 803/256-7446
Greenville 803/271-7044

Tennessee
Nashville 615/256-0625

Texas
Austin 512/479-0720
Dallas
Central 214/954-1100
North 214/387-1600
Fort Worth 817/338-0300
Houston
Downtown 713/751-0100
Galleria/Post Oak 713/439-0000
San Antonio 512/342-9898

Utah
Salt Lake City 801/966-3900

Virginia
McLean 703/790-5610

Washington
Seattle 206/454-6400
Spokane 509/838-7877

Wisconsin
Green Bay 414/432-1184
Madison 608/251-0104
Milwaukee 414/277-0345

Canada:
Ontario
Toronto
Don Mills 416/425-5730
Downtown 416/865-1125
Mississauga 416/848-3044

source edp®

Personal Services

The world's largest recruiting firm that specializes exclusively in the computer profession. Client companies assume our charges.

We didn't get to be first... by being third-rate!

National Computer Associates is number one in size and in the quality of its personnel consultants. We are the nation's largest network of independently owned firms specializing in the placement of computer professionals. When you come to us you'll have the assurance of knowing that you've made the best possible choice.

Come in. Call. Or mail your resume to the firm nearest to you. Company clients assume our fees.

ATLANTA: BM Lansing, 3475 Lenox Road N.E., Suite 400-C, Live Oak Center, Atlanta, Georgia 30326 (404) 231-4545
BOSTON: Robert Kleven and Co., Inc., North Bross Park, Suite One, 181 Bedford Street, Lexington, Massachusetts 02173 (617) 861-1020
CHICAGO: Theo. Hertz & Associates, 150 N. Wacker Drive, Suite 1700, Chicago, Illinois 60606 (312) 977-1955
COLUMBUS: Michael Thomas, Inc., 66 E. Wilson Bridge Road, Suite 201, Worthington, Ohio 43085 (614) 846-0926
DALLAS: DataPro Personnel Consultants, 12770 [illegible], Suite 520, Dallas, Texas 75230 (214) 661-8600
DETROIT: Electronic Systems Personnel, Inc., 3000 Town Center, Suite 2500, Southfield, Michigan 48075 (313) 353-5590
FLORIDA: Data Sciences Personnel, Inc., P.O. Box 8577, Hollywood, Florida 33024 (305) 434-0112
HARTFORD: Compass, Inc., 900 Asylum Avenue, Hartford, Connecticut 06105 (203) 549-4240
HOUSTON: Career Consultants, Inc., 2000 South Post Oak, Houston, Texas 77056 (713) 626-4100
INDIANAPOLIS: Career Consultants, 107 N. Pennsylvania, Suite 404, Indianapolis, Indiana 46204 (317) 639-5601
KANSAS CITY: D. P. Career Associates, 6405 Metcalf, Suite 501, Shawnee Mission, Kansas 66202 (913) 236-8280
LOS ANGELES: Superior Resources, Inc., Personnel Service, 17141 Ventura Boulevard, Suite 200, Encino, California 91316 (213) 986-4400
MILWAUKEE: EDP Consultants, Inc., 7332 West State Street, Suite 3, Milwaukee, Wisconsin 53213 (414) 475-0077
MINNEAPOLIS: Electronic Systems Personnel, 650 Twin City Federal Tower, 121 S. 8th St., Minneapolis, Minnesota 55402 (612) 338-6714
NEW JERSEY: Systems Search, 60 Midburn Avenue, Midburn, New Jersey 07041 (201) 761-4400
NEW YORK: Datal Associates, Inc., 7 Dey Street, Suite 410, New York, New York 10007 (212) 227-7370
NEW YORK UPSTATE: CFA Associates Personnel, Inc., 2530 James Street, Syracuse, New York 13206 (315) 463-8225
NORTH CAROLINA: DataMasters, Div. of TeamForce, Inc., P.O. Box 6060, Greensboro, North Carolina 27405 (919) 373-1461
PHILADELPHIA: Systems Personnel, Inc., 115 West State Street, Media, Pennsylvania 19063 (215) 565-8880
PHOENIX: Professional Career Consultants, 4725 Scottsdale Road, Suite 200, Scottsdale, Arizona 85251 (602) 274-5900
PITTSBURGH: Merrell Lepore & O'Brien, Inc., P.O. Box 836, Allison Park, Pennsylvania 15101 (412) 487-5150
SAN FRANCISCO: The Computer Resources Group, Inc. Agency, 303 Sacramento Street, San Francisco, California 94111 (415) 398-3535
SEATTLE: Hester, Martin, Morris & Associates, 1940 116th Avenue N.E., Bellevue, Washington 98004 (206) 453-2700
WASHINGTON D.C.: ESP Systems Corporation, 914 Lamberton Drive, Silver Spring, Maryland 20902 (301) 649-6171

Call the NCA firm nearest to you for Salary Survey and Relocation Information.

National Computer Associates

REPUBLIC
SYSTEM ANALYSTS AND LEAD PROGRAMMER ANALYSTS

Republic Airlines utilizes the industry's most sophisticated electronic information processing systems. In our Phoenix and Minneapolis facilities we have a need for experienced System Analysts and Lead Programmer Analysts with at least four years experience in structured COBOL involving:

- IBM HARDWARE
- ON-LINE IMS
- STRUCTURED DESIGN
- SERIES I

You could become a key member of a growing and resourceful data processing team. Now is the perfect time to investigate the challenges, opportunities for advancement and financial rewards. Interested candidates should submit comprehensive resume with salary requirements to:

K. Kasper
REPUBLIC AIRLINES
7500 Airline Drive
Minneapolis, MN 55450

An Equal Opportunity Employer M/F

EDP INCORPORATED

Our Clients need you!

Analysts Programmers Tech Specialists

Let us help you connect with outstanding career opportunities in the *SOUTHEAST*

Our clients have many challenging positions available.

Send your resume today, before your position is filled. All fees paid by our client companies.

E D P INCORPORATED
Suite 305, Fairview Plaza One
Charlotte, NC 28210
704/554-1151

COORDINATOR OF USER SERVICES

Primary liaison between computing services and academic users. Bachelors degree required. FORTRAN essential; other languages desirable. Strong interpersonal, oral and written communications skills necessary. Large system, microcomputer, and statistics experience desirable; prior user services experience helpful. Salary competitive; excellent fringe benefits. Available Fall 1984. Send letter of application, names of professional references, and resume by August 1 to:

Search Committee-User Services
Computing Services
SUNY College at Fredonia
Fredonia, NY 14063

SUNY College at Fredonia is an Equal Opportunity, Affirmative Action Employer.

D.P. Contractors

- All Expenses Paid
- Top Rates
- New Development Work
- Desirable National Locations

Sign Up Bonus
For Health Care Specialists
Also seeking
SECRET/FORTRAN

the EXPERTS

11 River St., Wellesley, MA 02181, (617) 237-1777
6911 Richmond Hwy., Alexandria, VA 22306, (703) 765-8800

COMPUTER PROGRAMMING INSTRUCTOR

A full-time instructor is needed to teach computer programming starting with the fall quarter. A master's degree in Computer Science or related field with 3 years data processing experience is preferred. A bachelor's degree with experience is required. Must have experience in COBOL and preferably know RPG II. For application form forward request and resume to Personnel Office, PO Drawer 1467, Greenwood, SC, 29648.

AN EQUAL OPPORTUNITY/ AFFIRMATIVE ACTION EMPLOYER.

TELE-COMM

Multiple oppty's. In CT for indiv's. with IBM software and T.P. tech. mgmt. bkgd. in lg. data comm., network planning environ. Salaries to $50,000.

ROBERT HALF
Of Hartford, Inc.
111 Pearl St.
Hartford, CT 06103
(203) 278-7170
Personnel Consultants

EDP PROFESSIONALS
NEW I.B.M. 4381 & 3083 INSTALLATION

The following expert staff members are required to supplement the technical nucleus of the newly-expanded computer department. Located in central New Jersey, Twin County Grocers, Inc. is a dynamic organization providing dependable services to meet the food industry's rapidly changing needs.

DIRECTOR-M.I.S.

The ideal candidate will have 10+ years experience, with at least 5 years in management capacity. The MIS Director will have responsibility for planning and managing a major vendor conversion effort from Honeywell to I.B.M.
The successful candidate will have a BS/MS and up-to-date familiarity with technical computing software, IBM M.I.S. systems including MVS/XA, NCP, DBMS and applications development. Strong interpersonal skills are essential to work effectively with vendors and user community.

(MVS) SR. SYSTEMS PROGRAMMERS

You will be responsible for the installation, maintenance, measurement, and tuning of our MVS/JES2 operating system and related software.
The position requires four or more years experience in an MVS environment. Knowledge of ACF/VTAM, NCP, TSO/SPF, SNA/SDLC, IDMS/R would be beneficial.

PROGRAMMER ANALYSTS

To participate in the conversion and development of new on-line applications. Opportunity to be involved in Users Requirement Definitions, Analysis, Design, Coding and Implementation of various business computer systems on IBM mainframe using COBOL, IDMS-DB/DC and fourth generation programming languages.

OPERATIONS SUPERVISOR/ SR. OPERATOR

Four years minimum experience in a large I.B.M. environment. Supervisory experience in an operations shift area. Liaison, troubleshooting and scheduling are a plus.

At Twin County Grocers, Inc., compensation and benefits are among the very best in the industry and include dental and prescription plans, tuition reimbursements, savings/thrift plans and much, much more!

Please send resume in confidence to:

Vice President,
Human Resources Department
Twin County Grocers, Inc.
145 Talmadge Road
Edison, New Jersey 08818

Twin County GROCERS, INC.

Foodtown

EXPLORE THE FUTURE WITH US

We are an industry leader and a $2+ billion division of PepsiCo, Inc., and we are positioned for the most extensive data processing expansion in our history of success. Frito-Lay's Management Service Division is a forerunner in state-of-the-art technology, with unapproachable professional growth opportunities for data processing professionals in our Dallas-based headquarters.

8100 Programmer/Analysts.

To qualify, you will possess a degree and 2-4 years experience in an 8100 DPPX environment, including a thorough working knowledge of DTMS, DPS, DSX, and COBOL. This position offers you long term growth opportunity.

Frito-Lay's rapidly expanding IBM multisystem environment is recognized as one of the most progressive installations in Dallas-Fort Worth. It includes 3081, 3084, 8100, Series 1, and an SNA/SDLC network of over 1400 terminals. We also utilize over 400 IBM/PCs and 280 3270/PCs in our office automation subsystem using CICS/DISOSS/PS. We are migrating to MVS/XA and are completing our migration from 3350 to 3380 disk units.

If advancing your career means upgrading to exceptional opportunity for career development, superior facilities with both free parking and a fitness center, and outstanding salary and benefits, including a 4½ day summer work week, then explore our progressive environment with many opportunities at Frito-Lay! For immediate consideration, forward your resume with salary requirements to:

Frito-Lay, Inc.
Professional Placement-CW
P.O. Box 35788
Dallas, Texas 75235

Equal Opportunity Employer, M/F/H/V

At Boeing, you can be the best part of our solution.

Throughout its corporate life, The Boeing Company has prospered by staying at the leading edge of technology. While still providing on-time quality products and services, all within budget. And achieving impressive goals like the introduction of two of the world's most technologically advanced commercial aircraft -- all in one year.

This enviable record has been particularly visible at Boeing Computer Services, where we are constantly faced with the challenges of explosive growth in information services. Challenges we meet on a day-to-day basis.

The unique knowledge we've gained, and the management tools we've developed, have assured our success. And are in even greater demand today than ever before. Because of this demand, we have immediate openings in a number of cities for the following special skills:

PROJECT LEADERSHIP
- Budgeting and project planning
- Major software construction
- Conversions

SYSTEMS ENGINEERING AND INTEGRATION
- Software package knowledge and experience
- Hardware and Software solution tradeoff analysis
- Support of Information Center and Office Services (plus related connectivity and productivity solutions)

ANALYSIS AND DATA BASE ADMINISTRATION
- Structured design methodology experience
- On-line data base processing competence with emphasis on major system development and/or conversion
- Multiple product and hardware familiarity

DATA CENTER MANAGEMENT
- With moderate sizes of mainframe computers (CRAY, IBM, Cyber, UNIVAC, etc.)
- Microprocessor-based technologies and micro/mainframe connectivity

NETWORK ANALYSIS AND MANAGEMENT
- Large-scale systems engineering and integration
- Voice, video and fax
- Telecommunications protocols

The ideal candidate possesses 5-7 years technical experience, 2 of which are supervisory in one of the aforementioned areas. Potential locations include:

- Philadelphia
- Chicago
- San Francisco
- Los Angeles
- Denver
- Washington, D.C.
- Seattle
- Morristown (NJ)
- Greenwich (CN)

And surrounding metropolitan areas.

You will find that our compensation programs are complete and competitive, our training among the finest offered in the industry, and our commitment to excellence unequalled.

For more information concerning these challenging positions, please call (703) 821-6992. Or send your resume and salary history in complete confidence to Walter Sanderson, III, Department CW20, BOEING COMPUTER SERVICES, 7980 Gallows Court, Vienna, VA 22180.

An Equal Opportunity Employer.

BOEING COMPUTER SERVICES A Division of The Boeing Company

POSITION ANNOUNCEMENTS

Data Processing

INTERNATIONAL SOFTWARE GROUP

requires

EXPERIENCED CONSULTANTS/ ANALYSTS/PROGRAMMERS

AT ALL LEVELS -- UP TO $60K

Candidate Profile!

- A minimum of 4 yrs. Systems and Programming experience
- Cobol or Assembler with CICS/IMS
- Experience in 4300/30xx environment
- Experience in the development of Application Software
- Knowledge of the Retail/Distribution Industry
- Consulting or System Development background
- Self-Starter with background of success
- Preparedness to travel throughout USA and Europe.

If you're looking for a challenge, can offer most of the profile, and you are prepared to work in a demanding environment which rewards hard work and commitment on a results basis; then call us, we are looking for Professionals.

We are a Chicago based software Group, recognized as the leaders in our field, we have customers throughout USA and Europe and are expanding our base. Send resume to:

CHAIN STORE SYSTEMS, LTD.
303 E. Wacker Drive
Suite 1900
Chicago, Illinois 60601
Phone: (312) 938-0171

SOUTHERN

LOCATIONS FOR

SYSTEMS PROGRAMMERS
OS/MVS
CICS or
VTAM/AFC
$29 - $36K

PROGRAMMER/ANALYSTS
COBOL
CICS or
IMS
BANKING APPLICATIONS
$24 - $34K

SYSTEMS ANALYSTS
IMS DB/DC or
CICS
OS/MVS
$29 - $36K

Client companies are leaders in their fields and pay all fees including relocation and interviewing...

Call (904) 725-0067
or send resume to:
KELLY DAVIDSON
P.O. Box 19141
Jacksonville, FL 32246-9141

Advanced Recruiters INC.

INSTRUCTOR

High-Tech Disciplines

INDIAN HILLS COMMUNITY COLLEGE has an immediate opening for a Certified Instructor with an associate's degree. Three years teaching experience is required, in such fields as electronic or computer technology, microprocessors, robotics, industrial education, or any combination of these. The salary for this position is open, and we offer superb benefits. To apply, send your resume or letter to:

Dr. R Gene Gardner
Dean, Institutional Services
INDIAN HILLS COMMUNITY COLLEGE
Grandview and Elm
Ottumwa, Iowa 52501
(515) 683-5107 M-Th
Res: (515) 682-6752
(Evenings and weekends)
EOE

IMS TEAM LEADER

Start-up div. of nat'l. svcs. org. seeks polished apps. proj. ldr. Will lead develop. group in on-line IBM 3081 OS/MVS IMS DB-DC COBOL environ. Technically challenging pos. w/hvy. user contact. Outstanding benefits pkg. $40,000.

SR. CICS TECH. CONSULTANT

Impressive fin'l. svcs. co. expanding its intrnl consult. staff. Progressive environ. req. demonstrated record of achievement, impeccable image & Macro CICS. BAL & OS/JCL skills. Super oppty. offering hi-vis. to sr. mgmt. $40,000

ROBERT HALF OF BOSTON, INC.
100 Summer Street
Boston, MA 02110
(617) 423-1200
Personnel Consultants

SENIOR SYSTEMS ANALYST

The University of Iowa Hospitals and Clinics is now seeking an experienced systems analyst to work in its IBM 3081-D MVS/XA dual processor environment. Responsibilities will include the design and implementation of major patient care systems using TSO/SPF, IMS/DL1, CICS, PL/1, IBM's Patient Care System, and the ANSWER/DB report writer. Candidates must have a minimum of 10 years of related data processing experience and education. The position combines a competitive salary and liberal fringe benefits with the cultural, recreational, and educational advantages of a Big-10 University community. Send resume, references, and salary history to:

Tracy M. Middleton
Information Systems
University of Iowa
Hospitals and Clinics
Iowa City, Iowa 52242

The University of Iowa is an Equal Opportunity/Affirmative Action employer.

SYSTEMS PROGRAMMER

MVS installation needs Systems Programmer with min. 2 years exp. for program product installation and maintenance. Typical assignments would include ACF2, UCC1 and DMS/OS. Requires self starter with recent IBM 370 background. Dual CPU, SPF-TSO IMS DB/DC environment. Excellent growth potential with opportunity to advance within a progressive organization. Starting salary $27K-$41K. Send resume to:

Steve Camilla
Information Services
City of Long Beach
333 West Ocean Blvd.
Long Beach, CA 90802

AA/EO Employer M/F

UPSTATE NEW YORK

Supervisor
Computer Operations

Organized high energy individual required by financial data processing center utilizing state-of-the-art software on an NCR 8555 multi-processor system. This supervisory position requires proven technical communication and people skills.

Excellent benefits and professional rewards highlight a competitive compensation package.

Qualified applicants should forward a resume to:

E.L. Maurer
Computer Operations Manager
Albany Savings Bank F.S.B.
P.O. Box 70
Albany, NY 12201

TOP NIELSEN-RATED PROGRAMMING CAREERS.

Nielsen Media Research Group is utilizing state-of-the-art data processing technologies to provide reliable television audience information to advertisers, ad agencies and broadcasters. Electronic meters installed in a scientifically selected cross-section of TV households, transmit information around-the-clock to our computer center on Florida's Gulf Coast.

To meet the demand for rapid, accurate data collection, analysis and distribution... we've expanded our ultramodern facilities and added IBM 3083 equipment. We hope you'll join us in this fast paced, ever-changing environment.

Our Computer Programmer positions require a BS in Computer Science and/or 2 years DP experience or equivalent. Thorough knowledge of PL/1 is essential. VSAM, CICS, MVS, SAS, or IBM Assembler Model 204 experience is highly desirable.

We offer excellent salaries and major company benefits including relocation assistance to our Dunedin, Florida location. Please send resume and salary history to:

A.C. Nielsen Company, Dept. CW-6/25, 375 Patricia Ave., Dunedin, Florida 33528. Or call us at (813) 734-5473. An equal opportunity employer, m/f/h/v.

Nielsen Media Research

FLORIDA/SUNBELT

$25K-$45K

PROGRAMMERS

- Systems
- Applications

DATA BASE

- Administrators
- Analysts

TECH SUPPORT

- Telecommunications
- Network Planning

2 years plus experience preferred in any of the following:

MVS, IMS, DBDC, IDMS, OS, CICS, TOTAL, PL1, COBOL, VSAM, VTAM, UNIX, 'C', COMTEN, FOCUS, CAD, GRAPHICS, X.25

For immediate professional and confidential consideration, please send resume to Wally Schmidt:

PARSONS CONSULTANTS INC.
Turnbull Professional Center
766 Turnbull Ave., Suite 202
Altamonte Springs, FL 32701

SYSTEMS PROGRAMMER DOS/VSE & VM/370

HARFORD COMMUNITY COLLEGE has an opening for an experienced Systems Programmer. The position reports to the Director of the College's computer center, but will be assigned, on a scheduled basis, to work one-half of the time at the Harford County Government computer center. The College is running an IBM 4341 with 3340/3350 disks and VM/370, DOS/VSE, CICS/VS, VOLLIE, UFO, SPSS, VSAM, BTAM, etc. County Government is running an IBM 4331 with 3340/3370 disks, using DOS/VSE, CICS/VS (Command Level COBOL), ICCF, VSAM, etc.

A Bachelor's Degree is required, and three years of experience in systems programming in a comparable environment is preferred.

Starting salary range is $25,800 to $35,100 (depending on education and experience), plus an excellent benefits package. The maximum salary on the pay scale is $42,300. Starting date is August 6, 1984. For additional information, call Bob Stewson at (301) 836-4234.

To apply, send a letter of application and a resume of work experience and education to Edward Kuhl, Director of Personnel, Harford Community College, 401 Thomas Run Road, Bel Air, Maryland 21014 as soon as possible, but not later than July 9, 1984.

HCC IS AN EO/AA EMPLOYER

HARFORD COMMUNITY COLLEGE

Assistant Director for Mainframe User Services

SYRACUSE UNIVERSITY is searching for a highly motivated individual whose background combines technical expertise with mainframe computers and software, management of high-level technical staff, and excellent human relations skills.

The Assistant Director for Mainframe User Services reports to the Director of Academic Computing Services, and has these duties and responsibilities:

- Manage the activities of the Mainframe User Services group, which includes 10-15 senior technical staff members plus graduate and undergraduate student programmers and consultants. Academic Computing Services runs 3 IBM 4341 s under VM/CMS and MVS and 1 DEC 10 under TOPS 10.
- Monitor and optimize total university needs for Mainframe User Services in the areas of word processing statistics and graphics packages and programming languages.
- Plan and coordinate the installation and maintenance of mainframe operating systems and all system software.
- Manage the Education and Consulting operations of Academic Computing Services.

Applicants should have earned at least a Master s degree in a computer related field and have 5 years of technical experience with computers, of which at least 2 years should include supervising high level technical personnel. An additional 5 years of technical experience plus a Bachelor s degree in a computer related field can substitute for a Master s degree. Extensive working knowledge of mainframe operating systems and software is essential. Experience in managing a group of computer professionals is required. Ability to interact effectively with faculty and students in all areas of study is important. Starting salary is negotiable. Position begins September 1, 1984.

Syracuse University is a major private [illegible] in New York with 15,000 undergraduate and graduate students, 1000 faculty and 3000 staff of which all but 7000 are computer users. Syracuse University's benefits include competitive salaries, advanced degree opportunities, dependent scholarships, and generous vacation and retirement plans. Send resume before July 15, 1984 to: Syracuse University Personnel Department, Skytop Office, Syracuse, NY 13210.

SYRACUSE UNIVERSITY
An Equal Opportunity
Affirmative Action Employer

DATA PROCESSING PROFESSIONALS

DATA RESOURCE CORPORATION, headquartered in Atlanta, is a leader in quality Contract Programming and Consulting. Our growth in the Southeast and Southwest has created opportunities for versatile Professionals with state-of-the-art skills in Programming and Systems Design.

We are seeking individuals who desire to work in various stimulating Data Processing environments. IMS and CICS skills are of special interest, as are the abilities to travel or relocate.

We offer you competitive salaries and comprehensive benefits programs, including bonuses and profit sharing, and overtime pay. If you are searching for a growth opportunity with a dynamic and progressive company with a Management team that "puts people first", then DRC is your answer.

For immediate consideration, send resume to 3301 Buckeye Rd. Suite 103, Atlanta, GA 30341, or call BECKY PINLEY or JIM BARRETT at 404-455-7260, or toll free:

1-800-241-8002

DRC
EOE

THE RESUME SYNDROME

19 of 20 Resumes end up in somebody's wastebasket. If you want your resume to be the 1 in 20 that gets results, send $5.00 for our booklet, "How to Write A Resume." To receive a FREE COPY, attach a copy of this ad to your resume and mail it to m U.S.A. only:

[illegible]

SOFTWARE SPECIALISTS
FIELD SERVICE ENGINEERS

The solution is in the mountains

Digital is innovation's best friend.

It is the ability to entertain the unique, to step around standard concepts to better conclusions—to make friends with change—that has earned us the reputation as the genius of the computer business.

We've brought innovation to the mountains where we've set up a solution system in the shadow of Pikes Peak in Colorado Springs.

It is a very different approach to customer support. It's centralized—a gathering of the best software and service engineering minds in one place to answer all questions.

This established remote service center provides technical support to clients and field engineering staffs throughout the U.S. and Canada. They call in for quick answers.

This center is staffed with high-tech talent—talent equipped with extensive computer resources. And a substantial library. It's all the resources in one location.

We are looking for professionals in the following areas to join us near our special mountain.

IN SOFTWARE SUPPORT:

SYSTEM SUPPORT
Requires 3 or more years VAX/VMS experience, plus demonstrated strong system programming experience using MACRO, BASIC and DCL.

VMS
Requires 2 or more years of system experience. Applications in high level languages preferred. VMS experience a definite plus.

VAX INFORMATION ARCHITECTURE
Requires 18 months experience in software services or applications design and programming, data base design, implementation and maintenance and/or forms management utilization. In-depth knowledge of VAX Information Architecture products such as DTR32, DBMS, and FMS is preferred.

DECnet
Requires 2 or more years experience working with DECnet applications, VAX, RSX, or RSTS systems and a solid knowledge of communications protocols.

TOPS-20/TOPS-10
Requires 2 or more years of operating system support experience with DECSYSTEM-20s, DECsystem-10s or other large timesharing systems exposure. Applications experience in several high level languages is preferred.

UNIX*
Requires 2 or more years experience using UNIX operating system and "C", preferably Berkeley UNIX, and its associated tools. *UNIX is a trademark of AT&T Bell Laboratories.

PRE-SALES/TECH SUPPORT
Requires 2 or more years system experience on one or more Digital operating systems and a basic knowledge of Digital hardware configurations.

IN FIELD SERVICE ENGINEERING:

As part of our Remote Support Staff, you would utilize complex test equipment, operating software, customer site historical data, diagnostic manipulation, configuration rules and other resources to identify and resolve system or device problems.

You must have 3+ years computer service experience, a knowledge of system operation and how to modify or improvise diagnostics and strong customer relations skills.

Advanced knowledge and work proficiency on PDP 11/70 & 11/44 or VAX 11/780 & 11/750 families of devices is preferred.

We know to attract the best minds we not only have to offer a stimulating intellectual environment—but a living environment that is special and unique. Colorado Springs is close to clear streams, wilderness trails, wide open spaces, long views —and reasonable housing costs. Yes, beauty can sometimes cost less.

Our relocation package will make your move comfortable.

Meet with us at

TECH FAIR® ...The Original

During NCC/Las Vegas
Tuesday & Wednesday, July 10 & 11
The Sands Hotel

If we miss you at TECH FAIR®, and you are looking for a stimulating environment, creative energy —and a view—contact Diane Karija, Dept. 0625 3804, Digital Equipment Corporation, 4405 N. Chestnut Street, Colorado Springs, Colorado 80907. Please indicate positions of interest.

We are an affirmative action employer.

People and Technology...
PERFECT INTERACTION

digital™

National's Challenge

Range & Innovation For Your Career Growth

National can offer you more technological range and innovation than any other corporation in "Silicon Valley." Each and every product is crafted with a dedication to quality by people who know that the key to success in this fiercely competitive market is reliability. If you share in our commitment, consider these opportunities.

Data Administrator

This is a challenging opportunity for an exceptional person to set future direction in data base for worldwide operations. You will be involved with users in a consulting capacity to NSC internal development groups. To qualify, you should have a BS/BA, or equivalent and at least 10 years' experience in an MIS related position. A strong knowledge of Cullinet's IDMS and IDD, as well as experience in an OS/MVS and IBM PCM environment are required. Experience in conceptual modeling an advantage.

Data Base Administrator/Analyst

You will be working with a group of data base consultants in a fast-paced, team environment with state-of-the-art hardware and software. Your key objective is to make a major contribution to system development productivity. IDMS/R is a definite plan in our future growth. Ideal candidate will have a working knowledge of IDMS and related Cullinet products, including experience in an OS/MVS and IBM PCM environment.

For immediate consideration, please send your resume to National Semiconductor, Dept. LR, P.O. Box 62499, Sunnyvale, CA 94088. We are an equal opportunity, affirmative action employer. Principals only, please.

Let's talk about your career.

National Semiconductor

Network Operations	to [illegible]
P/A COBOL, CICS	to [illegible]
Sr. P/A [illegible]/Banking	to [illegible]
Sys Prog. OS/MVS or DOS/VSE	to [illegible]
[illegible] Support Tech	to [illegible]
P/A Banking	to [illegible]
P/A [illegible] Packages	to [illegible]
P/A IDMS Fin Sys	to [illegible]
P/A IMS DB/DC Dev.	to [illegible]
Proj Ldr IMS Dev	to [illegible]
Assembler Prog.	to [illegible]
Sr P/A [illegible] P/L	to [illegible]
P/A COBOL OS/TSO	to [illegible]
Sys Analyst-Design Mfg	to [illegible]
P/A NCR [illegible]	to [illegible]
Sr P/A Honeywell GCOS 6/6	to [illegible]
Sr P/A PL1/IMS	to [illegible]
P/A CICS/DL1	to [illegible]
P/A Sys 34-MAPICS	to [illegible]

Plus over 300 other openings in Florida and the Southeast.

COMPUTERPEOPLE
[illegible] Blvd.
Suite [illegible]
Tampa, FL [illegible]
(813) [illegible]
We Serve Computer Professionals
- Exclusively -

DATA BASE ANALYST

Progressive hospital expanding its Information Services Department has new, full time opening for a Data Base Analyst. Successful applicants should possess the following:

- Bachelor's Degree in Computer Science, or related field
- DL/I Experience
- DOS/VS Experience
- On line (CICS) applications knowledge
- Well developed written and oral communication skills
- Previous DBA Responsibilities preferred.

Experience will be considered in lieu of some of the educational requirements.

Please forward resumes to the Employee Relations Department.

HARRISBURG HOSPITAL
South Front Street
Harrisburg, PA 17101
An equal opportunity employer

IBM
EAST COAST LOCATIONS

We specialize in the placement of IBM professionals and have numerous opportunities along the East Coast including:

P/A CICS/DL1	Carolina	To [illegible]
DBA IMS	Virginia	To [illegible]
P/A IMS/PL1	Washington	To [illegible]
Syst Prog OS	Virginia	To [illegible]
P/A CICS/COBOL	Maryland	To [illegible]
P/A BAL	Virginia	To [illegible]
P/A IDMS/COBOL	Maryland	To [illegible]
P/A CICS/BAL	Carolina	To [illegible]
Prog COBOL	Maryland	To [illegible]
DBA IDMS	Carolina	To [illegible]
P/A CICS/COBOL	Washington	To [illegible]

For additional information regarding these opportunities, call Mr. Lee Martin: (804) [illegible] or Forward Resume to:

fortune
Personnel Consultants
of Virginia Beach
510 S. Independence Blvd.
Virginia Beach, VA 23462

REVISED POSTING
DIRECTOR OF ADMINISTRATIVE SYSTEMS

(Principals ADP Systems Analyst)

Provides direction for the Student & Community Affairs systems support functions. Oversees operational production systems including mgmt. info. systems, financial, student, personnel, analytical, & admin. data. Directs systems studies & coord. dev. of computer systems to meet campus data requests. Hires & supv. staff. Reqts: to college grad. in Computer Sci. or related field + 6 yrs. exp. in administrative data processing. Exp. w/interactive mainframe & minicomputer business/admin. applications. Familiarity with a university desirable. $2871-$[illegible]/mo. Apply for #84-04-016 PA by July 1, 1984. Send resume to: University of California, Personnel Dept., Santa Barbara, CA 93106. An equal opportunity & affirm. action employer.

SMC

Immediate opening available for a business applications programmer with a minimum of 3 years experience using RSTS/E and BASIC+. Familiarity with order entry and inventory control a must. Send resume and salary history to SMC, 9401 De Soto Ave., Chatsworth, CA 91311-4991, Attn: Al Meehan.

Gould Ocean Systems Division seeks an experienced and ambitious

VAX Systems Programmer

GOULD

to provide technical support and guidance to Engineering and Scientific staff. This challenging position requires a BS in Computer Science or equivalent technical experience with 2+ years in scientific programming, 2 years of FORTRAN, 1 year of assembly and 1 year systems programming on VAX.

Successful candidate will be responsible for selection, generation, installation and modification of operating systems and systems level software. Multiple language skills, including FORTRAN 77, and some hardware knowledge desirable.

You will enjoy top competitive salary and generous company benefits designed to match your current and projected skill level while working in a professional career-oriented environment. For immediate and confidential consideration, send your resume with salary requirements to Employment Manager, GOULD DEFENSE SYSTEMS, INC., Ocean Systems Division, Dept. HR-[illegible], 18901 Euclid Avenue, Cleveland, Ohio 44117. No Third Party Inquiries Please. U.S. Citizenship is required. An Equal Opportunity Employer. M/F/H.

First National Bank in Albuquerque

The Information Systems Department of First National Bank in Albuquerque has excellent opportunities for Programmer/Analyst and a Sr. Systems Programmer.

Programmer/Analyst

The Programmer Analyst will become involved in the development and maintenance of both online and batch application systems. We are seeking professionals with appropriate degrees and/or experience in banking application as well as experience in IBM/370 assembler and COBOL. Also helpful would be CICS and OS/JCL coding experience.

Senior Systems Programmer

The Senior Systems Programmer will be responsible for the development and maintenance of our teleprocessing network. Our TP network is ACF/VTAM based under MVS/JES2 on two 4341-2 computers. We are seeking professionals with a minimum of 3 years experience in development and maintenance of ACF/VTAM and ACF/NCP. Qualified applicants must have a thorough understanding of BSC and SNA protocols, system maintenance using SMP, and IBM/370 assembler language. Background in CICS/VS helpful but not necessary.

First National Bank offers an excellent compensation and benefits package. Qualified applicants should submit resume and salary history to:

Employee Relations Manager
First National Bank in Albuquerque
P.O. Box 1305
Albuquerque, NM 87103
This position is for nonagency applications only

The First National Bank of Albuquerque
New Mexico's Largest Home-owned Independent Bank · Member FDIC
Convenient Locations City-Wide

we are an equal opportunity employer m/f/h

DATA PROCESSING MANAGER

Experienced professional needed to direct DP operations and staff in a marketing/manufacturing oriented environment. We are project-oriented, with emphasis on analysis, design and implementation of upgraded/new systems. Position provides opportunity for technical and career growth.

Ideal candidate will have a Bachelor's degree or equivalent and a minimum of 4 years management experience in DP, strong supervisory and communicative skills, proven record of accomplishment in implementation, working knowledge of RPG III and COBOL and IBM System 38 education/experience. Position reports to Director of Finance. Salary commensurate with experience. Comprehensive benefits program. For confidential consideration, send resume including salary history and requirements to:

Director of Personnel
C.B. FLEET COMPANY, INC.
P.O. Box 11349
Lynchburg, VA 24506

Equal Opportunity Employer M/F

COMPUTER POSITIONS AVAILABLE/ ADMINISTRATIVE COMPUTING CENTER IBM ENVIRONMENT

Assistant Director for Operations and Technical Services:
- Manages 31 people in data entry, data control, computer operations, and systems software groups. Previous DP management experience required. Salary $33,[illegible] - $[illegible].

Technical Services Manager:
- Working manager of a group of 4 supporting systems software (operating systems, telecommunications, DBMS, and utilities software products). Previous technical project leadership is vital. Salary $[illegible] - $42,116.

Computer Systems Senior Engineer:
- Member of the systems software group (technical services). Responsible for the support of CICS and other telecommunications software products. On-line programming experience required; previous CICS support experience preferred. Salary $[illegible] - $[illegible].

Apply: University of Virginia
Department of Personnel Administration
Carruthers Hall, P.O. Box 9007
Charlottesville, VA [illegible]
An Equal Opportunity/Affirmative Action Employer

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

WE'LL MATCH YOUR SALARY. RAISE IT. AND, GIVE YOU TIME AND A HALF FOR OVERTIME.

Allen Services knows top-notch programmers and analysts are a sure bet to the success of our national contract consulting business. So we up the ante in salaries and benefits to get the qualified consultants we need to satisfy our consulting contracts.

• Paid vacations and holidays • Health and life insurance • Dental insurance • Per diem allowance • Between project pay • 6-month merit reviews • Technical challenge • Professional growth • Constant up-grading of skills • Excellent salaries • Superior benefits...

Don't gamble with your career. Deal yourself a winning hand with Allen. Call us today 800-543-7583. In Ohio, call collect 513-890-1200. (SUBCONTRACTORS WELCOME)

ALLEN SERVICES COMPANY

A DIVISION OF CBA COMPUTER, INC.
212 West National Rd., Vandalia, OH 45377

The new generation of sophisticated electronics systems for the national defense is providing a strong foundation for the continued growth of Goodyear Aerospace. Recent long-term contracts call for more of the high-quality total systems engineering talents which have made us a major industry force.

SYSTEMS ANALYSTS

We seek an experienced Programmer and Business Systems Analyst to develop and support our growing capacity for state-of-the-art Business systems and systems support. Minimum 5 years progressively advanced programming experience is required with 2 years background on Sperry Series 1100 equipment. Practical knowledge of application package installation, including UNIS, PURCHASING 1100, and OS 1100/TIP with higher level languages is desirable. A BS Degree in Computer Science, MIS or other scientific discipline is strongly preferred. U.S. Citizenship is required.

A career move to Goodyear provides an opportunity to improve your personal and professional growth potential within an organization that respects and rewards data processing talent. Good salary and comprehensive benefits are commensurate with your projected skills. Our Northeast Ohio location provides an opportunity to choose from rural, suburban or metropolitan lifestyles. For immediate and confidential consideration, please send resume and salary history to: **Mrs. D.A. Dressler, Personnel Representative, Dept. 131-X,**

Akron, Ohio 44315
An Equal Opportunity Employer. M/F/H/V

GOODYEAR AEROSPACE

Data Processing

SYSTEMS ANALYSTS

PROJECT LEADERS

SENIOR SYSTEMS PROGRAMMERS

work with an Industry Leader!

If your analytical ability and expertise in large-scale business applications has surpassed the challenge of your present position, this opening with exceptional opportunity for advancement into management should interest you!.

Mutual of Omaha Provides:

- The prestige of working with the world's largest individual and family health insurance company in Omaha, Nebraska, a clean, progressive medium-sized city.
- State-of-the-art hardware (IBM 3084Q, 3081K, 3033AP, 3033UP)
- Structured systems development in a state-of-the-art software environment (IMS, CICS, COBOL, BAL, TSO/ISPF, ACF/VTAM, VM/CMS, MVS/XA)
- Well defined career progression program in a rapidly growing division-over 750 Data Processing professionals.
- Extensive in-house training-we keep you abreast of the latest developments in hardware and software.
- Competitive, performance-oriented salary and outstanding benefits

If you have proven skills on large-scale business applications utilizing IMS and a minimum of Four years of design and programming behind you, we would like to talk to you about an outstanding opportunity with a leader in the insurance industry.

Send your resume in strictest confidence, outlining your experience and salary requirements, to Don Kingsbury at the address below:

Mutual of Omaha.
People you can count on...

Mutual of Omaha Insurance Company
Mutual of Omaha Plaza • Omaha, Nebraska 68175

Equal Opportunity Employer M/F

FLORIDA

HP3000 CONSULTANT TO $40K

HP3000 technical background, business systems design experience. Retail industry helpful.

SOFTWARE PROGRAMMERS TO $45K

Systems programming experience with MVS operating systems, IMS data base or IDMS data base required.

SYSTEM ANALYST TO $40K

Large IBM, COBOL, IMS with system design of on-line financial systems. Challenging spot.

PROGRAMMERS

	YO
NCR-VRX - COBOL	$26K
SERIES 1, ASSEMBLER	$30K
4300, COBOL, CICS	$32K
APL, Time Sharing env	$30K

ROBERT [illegible] OF MIAMI, INC.
2665 Le Jeune Road, Ste 514
Coral Gables, FL 33134
(305)447-1757

FEE/RELOCATION PAID

Assistant Vice President/ Information Services Division

Blue Cross & Blue Shield of Mississippi, Inc., a recognized leader in the health insurance field, is upgrading its state-of-the-art computer facility, and plans to fill this expansion position.

The successful candidate will be accountable for all corporate automated processing systems to assure the accurate and practical compilation and documentation of data for user departments. Will conduct advanced planning and cost determinations for the company's EDP services to ensure proper equipment, time, and systems utilization.

8 to 15 years managerial experience within a business environment, proven human relations skills, and an in-depth knowledge of large scale AMDAHL and IBM computers as well as communications systems are required.

We offer a competitive salary with a full benefit plan in an excellent working environment. Qualified candidates should respond with resume, including salary history, to:

Blue Cross. Blue Shield.
of Mississippi

Recruiting Office
Blue Cross & Blue Shield of Mississippi, Inc.
P.O. Box 1043
Jackson, MS 39215-1043

POSITION ANNOUNCEMENTS

Put the best of Southern California on your horizon.

The ideal career environment — one that combines technical challenge in modern facilities with the best of Southern California living in unspoiled, oceanside Orange County— could be yours with the world-leading Burroughs Corporation.

Our Systems Development Group is growing so fast, we're opening a new software development center in Lake Forest, CA to complement our Santa Ana, CA center. Our programming opportunities are exceptional at these locations, in the following career employment areas:

System Software

- Compilers
- Computer Architecture
- Computer Network Architecture
- Data Communications
- Distributed Processing (Local & Wide Area Networking)
- Interactive Debugging Tools
- Operating Systems
- Work Station Systems

Environmental Software

- Advanced Database Management (Data Models, Query Languages & Data Dictionaries)
- Interactive Development Aids
- Message Control Systems
- Program Generators

Technical Writing

- User Manuals for Software Products

Programming positions require a BS or MS in Computer Science and an orientation to medium or large systems programming in any of the above listed areas. Writing positions require a BS degree in Computer Science, Technical Writing or Journalism combined with background in formal communication techniques and an understanding of programming languages.

Consider a community that presents an everyday invitation to outdoor recreation . . . consider a growing industry leader that offers excellent salaries, benefits and relocation assistance . . . consider Burroughs. Please send your resume to:

Human Resources Department
Burroughs Corporation
Systems Development Group
Dept. CW0625VS
3519 West Warner Ave.
Santa Ana, CA 92704

An Affirmative Action Employer M/F

Burroughs
THE QUESTION ISN'T WHO'S BIGGER. IT'S WHO'S BETTER.

Engineering

Outstanding Software Engineering opportunities in the Philadelphia area with INFOTRON . . . Senior Level.

INFOTRON, a datacom pioneer, manufactures, markets, and services a wide variety of sophisticated data communications equipment for networking, including network concentrators, statistical multiplexers, intelligent switching systems, and modems.

Over the past 6 years Infotron has grown at a compounded rate of 45% annually. We are definitely where the action is — one of the fastest growing & most exciting companies in the Philadelphia area.

You're needed to develop, implement, and support new software features and products as well as support existing sotfware products. **Senior openings call for professionals to provide technical direction to other members of our software staff.** BSEE or Computer Science degree is required . . . plus software design and development experience and experience with microprocessor assembly language. *Any communications experience is desirable*

We offer a highly competitive compensation package and many worthwhile benefits, including dental and prescription plans. To arrange an interview please send your resume complete with earnings history, to: **Bob Witkoski, Technical Employment Specialist, Infotron Systems Corporation, 9 N. Olney Ave., Cherry Hill Industrial Center, Cherry Hill, NJ 08003.** Equal opportunity employer

INFOTRON SYSTEMS

POSITION ANNOUNCEMENTS

FLORIDA

[illegible]

Many others to choose from. All fees and relocation paid. Mail resume to or call collect:

STAN ALLEN
ROBERT HALF
OF TAMPA, INC.
[illegible]
Tampa, FL [illegible]
(813) [illegible]

ENGINEERING COMPUTER SCIENTIST

Opportunity to work with Advanced Engineering Systems in the Aerospace Industry using state-of-the-art HP9000 computers. A minimum of 4 years experience in Fortran is required. Experience in simulation and stress analysis is desirable. MS in Engineering or Aerospace is required. Salary based on education and experience. Excellent benefits.

Please send resumes to:

Personnel Manager
Stencel Aero Engineering Corporation
A Talley Industries Co.
PO Box 1107
Arden, NC 28704

An Equal Opportunity Employer M/F/H/V

FACULTY POSITIONS IN BUSINESS COMPUTER INFORMATION SYSTEMS

The Computer Information Systems Department welcomes applications for faculty positions available September 4, 1984. Masters in Business preferred (will consider Bachelors degree with extensive business and teaching experience). Several years of recent experience in business systems analysis and programming is required. College teaching experience desirable. Requires strong interest in undergraduate instruction and ability to teach courses in several of the following areas: Systems Analysis, Programming Languages, Teleprocessing, and Data Base Management. Rank and salary will depend upon qualifications and experience. Salary range $[illegible]-$34,000 for 9 month academic year. Send complete resume to

Dr. Stuart J. Travis, Head, Computer Information Systems, Ferris State College, Big Rapids, MI 49307.

AFFIRMATIVE ACTION/
EQUAL OPPORTUNITY EMPLOYER

PROGRAMMER/MANAGER

Manufacturing Company located in foothills of Northeast PA's Pocono Mountains has an immediate opening for an experienced Programmer who is looking for opportunity to advance to Data Processing Manager. Our environment features an IBM 4331. Applicant must have 2 or more years of system programming experience on IBM, DOS/VSE environment utilizing CICS for online systems. 3 or more years COBOL and CICS programming experience and a knowledge of JCL and operations. Communication skills with user groups essential. Excellent benefits, competitive salary commensurate with experience. Send resume with letter in strict confidence to Box No. CW-84027, Computerworld, Box 880, Framingham, MA 01701

An Equal Opportunity Employer

DIRECTOR OF ACADEMIC COMPUTING SERVICES

We are accepting applications for a new position of Director of Academic Computing Services. Responsibilities include administration and coordination of academic computing services. M.S. in Computer Science, M.I.S., or related field. Three years teaching and/or academic computer experience in higher education preferred. Send resumes by 7-16-84 to:

Peg Gorman
Personnel Specialist
William Rainey Harper College
Algonquin and Roselle Roads
Palatine, IL 60067

Equal Opportunity Employer - M/F

CITY OF MIAMI EDP AUDITOR SALARY $[illegible] - $[illegible] YEARLY

Required bachelor's degree with major course work in accounting or business administration, plus 5 years experience in electronic data processing in the areas of programming and/or analysis. At least 2 of the 5 years of experience should be in public accounting and auditing. An equivalent combination of training and experience is acceptable. Proof of education must be submitted. Send resume to:

City of Miami
Department of Human Resources
Employment Office
P.O. Box 330708
Miami, FL 33233-0708

Equal Opportunity Employer

POSITION ANNOUNCEMENTS

FEDERAL EXPRESS... YOUR LINK TO THE FUTURE

At Federal Express, we've kept in touch with the future. That's why we have become the most advanced high technology package and document delivery company in the world . . . continually ready to greet new challenges by supplying innovative solutions. People are the heart of Federal Express because people have made us what we are today and what we will be tomorrow.

SENIOR COMMUNICATIONS SYSTEMS PROGRAMMER

Step into our fast-paced environment and work with sophisticated data systems and communications software development for a wide variety of on-line systems. Consult and plan configurations and ensure appropriate hardware/software support. You'll need:

- Five years of systems software support in large IBM shop.
- In-depth knowledge of MVS, VTAM, NCP, ASSEMBLER, communication hardware concepts and communication protocols.
- Previous experience with TSO, IMS and VM preferred.
- Knowledge of COBOL and SAS preferred.
- Ability to use SMP utilities preferred.
- Bachelor's degree in a computer related field preferred.
- Good communication and organization/planning skills.

Continue your career with an industry leader in the overnight movement of high priority business goods and documents. We can offer you an attractive salary, complete benefits, and a position with plenty of professional challenge. Find out more about your potential role with Federal Express by sending your resume and salary requirements in confidence to:

Diane Conner
FEDERAL EXPRESS CORPORATION
P.O. Box 727, Dept. 4621/DGCW
Memphis, TN 38194
Equal Opportunity Employer M/F

SENIOR SYSTEMS PROGRAMMER

Cedars' expanding Data Systems Department is seeking an experienced Senior Systems Programmer to install and maintain all operating and communication systems and information systems software. Qualified candidates will have a minimum of 3 years experience in the installation and maintenance of DOS/VSE and CICS systems. Associates degree or equivalent experience required.

Cedars offers excellent salary and comprehensive benefits including free medical/life insurance, parking and prepaid tuition. Please send your resume with salary history to: Joyce Newis, Personnel Services, Dept. CW 6/25.

Cedars is the exception.

1400 N.W. 12th Avenue, Miami, FL 33136
Equal Opportunity Including Qualified Handicapped Individuals Employer

---

THE UNIVERSITY OF IOWA HOSPITALS AND CLINICS
Assistant Director - Patient Care Applications

The Information Systems Department supports the patient-oriented computing requirements for The University of Iowa Hospitals and Clinics. The Department is currently developing a patient centered Hospital Information System. Application development and operation is carried out on two IBM 3081-Ds under MVS/XA utilizing PL/1 and IBM's Patient Care System. The system currently supports 500 terminals in applications ranging from patient registration and appointment scheduling to laboratory result reporting.

Candidates for this position should possess a Master's degree in a Computer Science related area or an equivalent combination of education and experience. Progressively responsible and extensive technical, administrative, and supervisory experience in health care and related data processing is required.

Send resume and salary history to:

James R. Wagner, Director
Information Systems Department
University of Iowa Hospitals and Clinics
Iowa City, Iowa 52242

The University of Iowa is an Equal Opportunity/Affirmative Action Employer

---

THIS SPACE FOR HIRE.

(Inquire at Classified Advertising Dept.)

COMPUTERWORLD

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

HACKERS WANTED FOR NETWORK RESEARCH

Professionals are known by the company they keep. That's why more and more talented engineers, scientists, and computer experts are joining M/A-COM LINKABIT.

We have established a national reputation for excellence in C³I, military satellite systems, military satellite terminals, and networks. And if you have the experience and education listed below, you now have the opportunity to share in the excitement and intellectual challenge of a LINKABIT career. Join us.

These positions call for a BSCS (MS preferred), 0-2 years of experience, and familiarity with local area networks, operating systems, DoD protocol suite (IP/TCP), ISO suite, and X.25. Candidates will work in research programs in network architecture and protocol suites. The qualified applicants may also work in network vulnerability, C³I systems, and protocols that support defense networks that may be vulnerable. To qualify, a knowledge of DoD protocol suite (IP/TCP), ARPANAUT, and protocol verification is required. An advanced degree in EE or CS is preferred.

DIGITAL SIGNAL PROCESSING ENGINEERS

We are also seeking talented individuals who are familiar with software implementation and digital filtering techniques, have PLM or other high-level language experience, and are knowledgeable in the software design strategies that support signal processing techniques. Additionally, a BSEE/CS or advanced degree and 3+ years experience are preferred.

M/A-COM LINKABIT offers excellent compensation, full company-paid benefits, and the opportunity to work with the best and the brightest minds in the nation. Additionally, we offer an attractive suburban Washington, D.C. location, where you can experience all the excitement this area affords.

For immediate and confidential consideration, please send your resume to: Steve Parker, M/A-COM LINKABIT, 8619 Westwood Center Drive, Vienna, VA 22180 (703) 734-9000.

M/A-COM

M/A-COM LINKABIT

An Equal Opportunity Employer U.S. Citizenship Required

SENIOR SYSTEMS ANALYST

Isn't It Time You Thought About Memphis?

SCHERING-PLOUGH's popular product line, which includes such international names as Maybelline, Dr. Scholl's, St. Joseph, Coppertone and Di-Gel has made us a company of exceptional growth and outstanding career opportunities.

An exciting opportunity now exists with our International Consumer Products Division, based in Memphis, TN, for a Senior Systems Analyst. We require a minimum of 3 years experience programming on System 36. You should also have experience in customer service and manufacturing applications. In addition, you should be able to work independently and be willing to travel extensively abroad, with up to 40% international travel.

If you are interested in a genuine growth opportunity and a real challenge, isn't it time you thought about Fortune 300 Schering-Plough and Memphis? Our location offers a diverse lifestyle, rich in cultural heritage and modern recreational diversions. We will reward your efforts with an attractive compensation package and excellent opportunities for advancement. Please send your resume in confidence to:

Personnel/ICPD
Schering-Plough
Consumer Operation
P.O. Box 377A • Memphis, TN 38151

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide, you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill-Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0595

From outside New Jersey, call toll-free 800-222-0153

RSVP SERVICES
Employment Agents for Computer Professionals

Systems Programmers & Managers

Use Your Computer Background To Move Into CAD at AMD!

Advanced Micro Devices is the fifth largest — and fastest growing — integrated circuit company in America. Sales for fiscal 1984 were $583 million, 83% above last year, and profit margins were the highest in AMD history.

A significant portion of our growing resources is committed to the large-scale, on-going development of a corporate CAD network. We're using IBM 30XX mainframes, VM/UNIX and a network of specialized processors to support our state-of-the-art CAD workstations. By this time next year, CAD capacity and staff at AMD will more than double. This is your opportunity to be at the forefront of systems technology in AMD's CAD Systems Directorate.

Openings in Our Engineering Data Center

Department Managers

If you've spent at least the last 2 years managing systems programming, you could be the person to lead a group of 4-8 technical people supporting CAD engineering needs. You'll provide models and advice for performance tuning, capacity planning and security. Requires BSEE/CS and 2 years VM systems programming experience with IBM 308X computers in addition to management experience.

Sr. Systems Programmers

Install/maintain/support VM and/or UNIX on our 30XX mainframes and IBM PCs. Project leadership opportunities include evaluation/selection of hardware/software; user support; QA installation; capacity planning/performance tuning. Requires BS/MS in Computer Science or equivalent technical field and 3-5 years experience in VM, VM/CMS or UNIX systems programming.

Systems Programmers

Support CAD users/engineers with Execs, JCL/high-level language programming, UNIX shell programs, and/or UNIX training. Requires BSEE/CS and 2-3 years systems programming experience with VM/CMS or UNIX. Exec writing experience essential. Knowledge of VLSI and/or CAD a plus.

AMD's total commitment to CAD development is as sincere as our commitment to continued success. When you join the IC Industry's most forward-looking CAD team, your career will receive all the support and growth you deserve.

For confidential consideration, call Ed Lake, weekdays, TOLL FREE at (800) 538-8450, ext. 5555. Or send your resume to Advanced Micro Devices, Dept. CW-625, MS-57, 901 Thompson Place, P.O. Box 3453, Sunnyvale, California 94088. An equal opportunity employer. Principals only, please.

Advanced Micro Devices

Bryant Bureau

HAS THE COMPUTER PROGRAM FOR YOU

[illegible]

NATIONWIDE OPPORTUNITIES

[illegible]

Bryant Bureau
DP Division
[illegible]

USAIR

ACP/TPF & IMS

PROGRAMMERS & ANALYSTS

USAir, a growth-oriented airline, is seeking candidates with 1-4 years of experience on ACP/TPF systems for positions in our computer center in Fairfax, VA. Current and future opportunities exist for Systems Programmers, Data Base Analysts, Jr./Int./Sr. Programmers, and Applications Programmer Analysts.

If you are interested in learning more about our career opportunities in a state-of-the-art environment (TPF-II, MVS/SP1.3, IMS 1.2, and future plans for XA and IMS 1.3), with on-going training and a comprehensive benefits package, call Allen Presswood, COLLECT, at (703) 892-7246 or send resume, in confidence, to:

USAir
Employment Services Dept. (MIS)
P.O. Box 15866
Arlington, VA 22215

An Equal Opportunity Employer M/F

Help Write a New Chapter in Telecommunications History

Digital Switch Corporation is an aggressive, growth-oriented leader in the design, development and manufacture of advanced digital telecommunications switching equipment. Due to our rapid growth and expansion, we currently have the following positions available:

TELECOMMUNICATIONS MANAGER

Responsibilities include the planning, installing, maintaining, and tuning the Local Area Network for the company. 5 years experience with Ethernet and DEC peripherals is required. Must possess excellent oral and written communications skills as well as the ability to work effectively with all levels of management and staff.

VMS SYSTEMS PROGRAMMERS

Will be responsible for installing and maintaining VMS 3.5-4.0 operating systems in a large VAX 11/780-782 cluster environment with extensive telecommunications systems. Other duties include developing special projects related to computer center operation and user interfaces. Experience required is 3-5 years VAX-VMS systems programming in a large systems environment.

Digital Switch Corporation offers a generous salary and benefits package including life/medical/dental/stock purchase/thrift plan and educational assistance. For immediate consideration, please send your resume in confidence to:

Digital Switch Corporation
Staffing Manager
Dept. 1000 JB
P.O. Box 830911
Richardson, Texas 75083-0911

equal opportunity employer

Digital Switch Corporation

FINANCIAL SYSTEMS ANALYSTS

Our Corporate commitment to sophisticated computer systems technology has allowed our growth to the next level of "State of the Art" systems development by separating the operational and systems aspects of a corporate project.

Successful candidates will have:

- A minimum of 4 years experience in developing financial systems
- Experience in System Design, Modeling, Spread-Sheet Analysis, and Graphics Applications
- Experience with IBM or Honeywell systems using M & D Software and/or IFPS
- B.S. or M.B.A. Degree in Finance or Information Systems a plus
- Excellent oral and written communication skills

We offer a competitive salary and outstanding benefits including Major-Medical, Hospitalization, Life, Dental & Optical Insurance, Retirement Plan, Savings & Investment Plan, PAID RELOCATION, and much more.

SERVICE MERCHANDISE COMPANY, INC.

Send confidential resume, including salary history, to:
Darly Searcy
Manager of Recruiting
P.O. Box 24600 (CW)
Nashville, TN 37202

Equal Opportunity Employer M/F/H/V

BUSINESS SYSTEMS ANALYST

Major consumer goods mfr. seeks Sr. Sys. Analyst w/min. 10 yrs. mfg. bkgrd. incl.5+ yrs. Sys. Analysis. APICS cert. a +. $33,000.

ROBERT HALF OF PROVIDENCE, INC.
900 Turks Head Building
Providence, RI 02903
(401) 274-8700
Personnel Consultants

APPLICATIONS ANALYST

Digi-Key is a rapidly expanding mail order distributor of electronic components serving a national market since 1972. We are located in rural Northwest Minnesota near excellent recreational opportunities including fishing, big game hunting, and much more.

We are seeking a person with extensive exposure to Assembly Language Programming of [illegible] in a real time environment. A Bachelor's Degree in Electrical Engineering or Computer Science is required, a Master's Degree is desirable. Exposure to Perkin-Elmer systems a plus. A salary in the range of [illegible] to [illegible] depending on education and experience plus a good benefits package are offered for your service.

Keith Stave
Digi-Key Corporation
Highway 32 South
Thief River Falls, MN 56701
800-346-5144 or 218-681-6674

programmer analyst

PROGRAMMER ANALYST

Financial data center in Orlando, Florida seeks individual with at least 2 years experience in COBOL programming in banking applications and savings and loan conversion experience. On-line real time programming and Burrough's large system (B7800 series) hardware experience required. Must be proficient at systems design, preparation of flow charts and program specs, verification of program logic and preparation of system documentation. Working knowledge of consumer loan, line of credit and variable rate mortgage applications preferred. College degree preferred. MBA a definite plus. Salary $[illegible] depending on experience. Contact Job Service of Florida, Job Order #[illegible], 2421 Lawton Road, Orlando, FL 32803.

An Equal Opportunity Employer

ROBERT HALF

MVS Performance Analysts

Central Florida Fortune 500 Data Center needs several individuals experienced in MVS performance. Some capacity planning required. Experience with SAS, RMF, and SMF would be a plus. Immediate need.

Mail resume or call:

Dorothea Sams
Robert Half of Orlando
P.O. Box 17[illegible]
Orlando, Florida 32[illegible]
(305) [illegible]

SR. SYSTEMS ANALYST OVERSEAS-SUPERVISOR
Salary area $[illegible]+

Work in one of the world's most modern and sophisticated petroleum computer centers [illegible] mainframes/systems and supercomputers (Cray). Be involved in extensive user interface, feasibility studies, database design and management and a host of technical applications. Package includes overseas bonus, single/family status, American-style living and schools, 40 days paid vacation and more. For arrangements, call Leroy Crang or Dick Stamm (713) 784-[illegible] or M. Butler at (713) [illegible].

ALL FEES ASSUMED BY CLIENT COMPANIES
M. DAVID LOWE PERSONNEL SERVICES
6117 Richmond Avenue
Houston, TX 77057

Project Manager With Interior Department

"The Interior Department, Bureau of Land Management seeks individual to serve as Project Manager (BM-301-13) of a sophisticated records system in Denver, Colorado. Salary Range from $[illegible] to $[illegible]. Applicants must have a minimum of [illegible] years experience in functions directly related to this position. Education in directly related fields may be substituted for some experience requirements. Candidates must have knowledge of and be [illegible]

Experienced Programmer/Analysts

CALL US...

We'll Help You Grow

M.I.S. International is one of Michigan's largest software services corporations supplying data processing professionals to Midwest area companies. In addition, AUTOFLEX, Inc., a subsidiary of M.I.S., is heavily involved in the design and development of Robotics equipment and software systems.

If you have at least one year of experience in any of the following disciplines and desire a high tech state-of-the-art environment, call Personnel Recruitment or forward your resume.

- COBOL or PL 1 using TSO/SPF or VM/CMS
- IMS DB/DC
- CICS Command-Level
- IMAGE/VIEW 3000
- IBM PC with Networking

M.I.S. INTERNATIONAL INC
24655 Southfield Road
Southfield, Michigan 48075
(313) 552-[illegible]
1-800-521-3144
Equal Opportunity Employer
"A Total Systems Company"

Data Processing Professionals

We can offer you the challenges of the year

We're the Matrix Organization, Inc., a rapidly expanding multi-million dollar data processing consulting and contracting firm. In the past five years we've built a solid reputation for quality project management in high level consulting services. Now we're looking for aggressive hardworking professionals ready to tackle the challenges of the year, presented by our clients in the Boston/Philadelphia corridor.

If you have experience in any of the following areas, we can give you the challenge.

ADABAS
NATURAL
CICS

The Matrix Organization can offer you excellent compensation, benefits, growth potential and the exciting challenges of the year. Send your resume in confidence or contact:

The MATRIX Organization, Inc.
the people for projects

P.O. Box 123, TOPSFIELD, MA 01983, (617)[illegible]
P.O. Box 480, [illegible], PA [illegible], (215)[illegible]

HIRING?

More computer people read Computerworld than any other newspaper in the United States - more than half a million computer people every week. And, among our 529,650 readers at user organizations about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads). No wonder Computerworld carries more recruitment ads for computer people than any other publication. To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
Computerworld
Box 880
Framingham, MA 01701

1-800-343-6474 — 617-879-0700

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

OS/MVS Systems Programmers

Test your mettle in one of the world's most advanced IBM environments.

A bit about SMS

SMS invites you to take a look at the future. You'll see it in our Data Center which handles over 3 million transactions a day, has a telecommunication capacity which rivals that of many major cities, and incorporates one of the world's most advanced IBM hardware configurations (multiple 3033s, 3033s and 4341s delivering over 70 M.I.P.S. of processing power to 4,500 terminals). But those are just facts and figures. The real story tells of the programmers and analysts who bring this technology to life.

Right now, we have positions available in our Systems Development Group for programmers whose background includes at least one year in an IBM OS/MVS environment. Experience in one or more of the following areas would be a significant plus:

- CICS Internals
- DB Internals
- Telecommunications
- IBM PC Data Communications
- OS/MVS Systems & Sub-systems Support

SMS offers a competitive salary, generous relocation assistance, and a benefits package which includes stock purchase, tuition refund, and dental plans. In addition, these positions represent an exceptional opportunity for continued technical and management development. For immediate consideration forward your resume to: SMS, Department CW-24RS, 51 Valley Stream Parkway, Malvern, PA 19355. An equal opportunity employer.

SMS

Shared Medical Systems Corporation

INFORMATION SYSTEMS FOR THE HEALTH CARE INDUSTRY...TWICE THE CAREER POTENTIAL

THE DATAPOINT CHALLENGE!

MIS Professionals

DATAPOINT, a Fortune 500 company, is a leading developer, manufacturer, and marketer of information processing equipment including ARC®, the world's first and most popular LAN. The MIS group is currently seeking professionals to join in creating the industry's most sophisticated MIS function. If you enjoy high visibility, challenge, and recognition take this opportunity to join a leader.

- MANAGERS
- SUPERVISORS
- DATABASE ANALYSTS
- OPERATIONS ANALYSTS
- SYSTEMS PROGRAMMERS
- COMMUNICATIONS ANALYSTS
- APPLICATIONS PROGRAMMERS

These positions require an individual with a degree in MIS, Computer Science, or Business, and experience in an IBM 308X/MVS-XA environment utilizing IDMS, ADS-O, and Roscoe development tools.

800-531-5770 800-292-5106 (In Texas)

DATAPOINT offers an excellent salary and benefit package and the enjoyable lifestyle of the south Texas "hill country." Spark your career today by calling the 24 hr. toll-free number or mail your resume to: Technical Recruiter, Datapoint Corporation, 9725 Datapoint Dr., MSC-05-137, San Antonio, TX 78284. An Equal Opportunity Employer m/f/h/v.
(refer to ad 137)

DATAPOINT
We sparked the revolution.

SYSTEMS PROGRAMMER

SOFTWARS

Software is the strategic key in the high-tech battleground of advanced telecommunications. Your talent can put you in a commanding position with the core organization in the field. We've got the breakthrough advantages. Ride with us into a new kind of future.

To qualify, you need a CS or Math degree, 2+ years of MVS experience in Assembler, VTAM, TCAM, COMTEN or IBM front-end (AC, BISYNC, or X 25 a plus!). ...and drive.

Send resume to Management Recruiter, AT&T Communications, Dept CW-7, 250 N. Maple Ave., Basking Ridge, NJ 07920.

AT&T Communications

An equal opportunity employer.

$30 - $40 PER HOUR CONTRACT PROGRAMMING

Computerware, Inc., a nationwide DP contract service, has continuing needs for Programmers and Software Engineers of all disciplines. Most critical current needs include:

- 'C' and UNIX Software Development. Locations in New York, North Carolina and California. Rates $35-$40/hour.
- Telephony Programmers, call processing experience, Florida location, rates to $35/hour.
- PARS programming experience, Texas location, rates wide open.

Call or send resume to:
Computerware, Inc.
12901 Nicholson Rd. #200
Dallas, TX 75234
(214) 620-2001

THE UNIVERSITY OF IOWA HOSPITALS & CLINICS

The mission of the Information Systems Department is to develop and maintain a patient-centered Hospital Information System for The University of Iowa Hospitals & Clinics. Existing applications, ranging from patient registration to laboratory results reporting, are supported on a network of over 600 terminals attached to an IBM 3081. New application development is carried out on a second IBM 3081. Both computers run under MVS/XA and the applications utilize CICS, DL/I, PL/I and IBM's Patient Care System. Development work is done using TSO/EPF. We have the following openings:

Systems Support Manager

The Systems Support Manager plans, manages, and participates in the activities of a five-person Systems Support Group. The Group maintains over 60 software products which provide the framework upon which all Hospital applications are built. Responsibilities of the Group include software maintenance and upgrades, problem determination and resolution, tuning, application personnel consulting, capacity planning, and performance measurement.

A Bachelor's Degree in Computer Science or related discipline, or an equivalent combination of education and experience is a requirement for the position. Extensive systems programming experience involving large-scale on-line operating systems is also required. Supervisory experience is desirable. The salary range is $27,500 to $35,000, with starting salary dependent on qualifications.

If you meet the above qualifications and would like to work in an up-to-date DP environment, while enjoying the benefits of a university community, please send a resume and salary history to:

Richard Brenner
Information Systems Department
University of Iowa Hospitals & Clinics
Iowa City, Iowa 52242

The University of Iowa is an Equal Opportunity Affirmative Action Employer

POLICE DEPARTMENT BALTIMORE, MARYLAND SYSTEMS PROGRAMMER

Bachelor's degree from an accredited college or university and 2 yrs. of computer programming exp. including 2 yrs. in systems programming. A knowledge of the following preferred:

IBM 4300	Hardware
VM/SP	Rel 3
DOS/VSE	Rel 3
CICS	1.3
ACF/VTAM	Rel 3
ACF/NCP/VS	3.1
DL/1	1.6
DMS	Rel 3
COBOL	Rel 3
EASYTRIEVE	

Send resume' of work & salary history to:

Baltimore Police Dept.
Personnel Services Section 708
601 E. Fayette Street
Baltimore, Maryland 21202

An Equal Opportunity Employer M/F

Why should a CDC SYSTEMS PROGRAMMER like you come to Combustion Engineering?

Because we're a multi-billion-dollar energy systems leader that runs one of the world's most advanced data processing and communications networks.

Because we provide access to the latest state-of-the-art computer hardware and software, and the opportunity to expand your technical expertise. You'll be working in a Control Data Cyber 800 NOS environment—with operating systems internals.

You will find stimulating associates, and fine career prospects.

Your credentials should include a technical degree and 2–5 years experience in systems programming and analysis. Must be experienced with NOS internals. This should include modification and extensions aimed at improving systems capability and stability.

Our Data Center is in Windsor, Conn.—an area offering excellent real estate, educational and recreational possibilities. Learn more. Please send confidential resume with salary history to: Mr. John S. Brancati, Combustion Engineering, Inc., 90 Lamberton Road, Windsor, CT 06095.

COMBUSTION ENGINEERING
The Energy Systems Company

An equal opportunity employer, m/f

POSITION ANNOUNCEMENTS

SENIOR SOFTWARE ENGINEERING MANAGER-DESIGN INFORMATION MANAGEMENT

Digital Equipment Corporation, a pioneer in the field of computer-aided methodologies, plans to integrate all design automation tools and design information into a unified whole. It's a complex assignment with enormous implications for the future of computer-aided methodologies and techniques.

If you join us, you will plan and coordinate development of advanced information systems to support product engineering and manufacturing. Manage several projects, united by a common architecture, to produce a series of compatible systems, from advanced file manager to distributed evolvable data management system; teach and translate IM concepts to management, CAD designers and, most importantly, users. Keep other groups informed of progress; work with clients to assure successful use of system.

Position requires experience in hardware and software design, information architecture languages, CAD tool design and information/DataBase Management installation. Good communication skills necessary. Must have successfully managed a major project to completion. Experience in distributed, network, and communications systems desirable.

Please forward resume and salary history to: **Gary Sicard, Digital Equipment Corporation, Dept. 0625 3604, 146 Main Street, Maynard, MA 01754.**

We are an affirmative action employer.

digital™

Mechanical Engineer

Develop software for industrial and manufacturing application of computer-aided process planning; develop visual systems for robots for assembly and on-line inspecting, using [illegible] Systems, Dynamics and Matrix methods; [illegible] PhD Mechanical & Systems Engineering. Background must include process planning, fortran and PL/I computer languages; optical and signal process and experimental [illegible] for stress and strain analysis as acquired through experience and research. 40 hrs wk. $18.00 hr. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Reference No. 17464. Employer Paid Ad.

PROGRAMMER/ANALYST

A growing independent aluminum extrusion company offers a unique opportunity to an experienced DP professional. The company has a System 38 and is developing manufacturing systems using this technology. The professional we seek should have extensive on-line data base systems background, experience with IBM System 38 hardware and RPG III. A manufacturing applications background would be an advantage. Company offers attractive salary, relocation, and fringe benefit package. Send resume and salary history to:

CW-B4828
Computerworld
P.O. Box 880
Framingham, MA 01701

Design, write, code and debug state of the art business and engineering software using FORTRAN, PASCAL, Assembly and C languages. 40 hours per week. MS in Computer Science and 1 year experience required. $23,833 per year. Good recent references. Out of state applicants by resume only. Apply at the Texas Employment Commission, Houston, Texas or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778, J.O. #3474821. Ad paid by an equal employment opportunity employer.

MARKETING ENGINEER

Direct business activities for company engaged in sales & service of computer hardware and software systems. Plan, coordinate sales and service program, contact new clients, review clients business requirements to recommend computer systems applications to business functions. Develop custom software program for use with selected hardware, develop and conduct training program for customer personnel, provide immediate service to computers. Requires five years experience, knowledge of operations of hardware and ability to develop custom software. Job site Glendale, CA. Salary $30,000 per year. Send ad with resume to Job No. 9109, PO Box 665, Sacramento, CA 95804 no later than July 5th, 1984.

SYSTEMS PROGRAMMER
SYSTEMS ANALYST
SENIOR ELECTRONIC FIELD ENGINEER

TECHNICOLOR GOVERNMENT SERVICES, INC. at the Earth Resources Observation Systems (EROS) Data Center has immediate openings for the following professionals:

SYSTEMS PROGRAMMER: Computer science, math or related degree required. Responsibilities include installation, debugging, upgrading and maintaining operating systems, utility and network software on a series of computer systems including DEC and SEL. UNIX operating system experience preferable.

SYSTEMS ANALYST: Computer science, math, or related degree required. Analysis and implementation of scientific software to support image processing applications, specialized product generation systems and host applications for network of remote image processing systems. Design, develop and maintain applications data bases for storage, retrieval and management of spatially related Earth sciences data. Evaluate, specify, install and maintain vendor-supplied data base management systems in a variety of computer systems and application environment.

SENIOR ELECTRONIC FIELD ENGINEER: On-site position. Applicants should have a minimum of four years experience in computer maintenance including peripherals such as printers, disk drives, card readers, tape drives and CRT terminals. Experience with SEL 32/77 or 32/87, PDP11 Series, or VAX 11/780 computers required.

We can offer you an excellent income, comprehensive benefits and relocation assistance. For prompt and confidential consideration and additional information, please send resume or call: **PERSONNEL SUPERVISOR, TECHNICOLOR GOVERNMENT SERVICES, INC., P.O. BOX 1242, SIOUX FALLS, S.D. 57101 (605) 594-6572.**

An Equal Opportunity Employer M/F/H

A BETTER WAY OF LIFE

JOIN THE LEADING EDGE

OUR CLIENTS, the leading national and international corporations offer outstanding career opportunities, latest state of the art technology, nationally competitive salaries and the finest fringe benefits available in highly attractive Southeastern locations. Salaries from $22-42 K

ANALYST • PROGRAMMERS
with a minimum of 2 years experience in:

TECHNICAL SUPPORT
PROCESS CONTROL
SCIENTIFIC PROGRAMMING
COMMERCIAL APPLICATIONS

OR LARGE IBM MAINFRAME OR IBM 8100 DEC PDP OR VAX HARDWARE IN VM, MVS, IMS, IDMS, CICS, SNA/SDLC, DPPX, DPCX, RSX-11M+ DECNET

WE ARE PROFESSIONAL RECRUITERS
Our client companies pay our fees and your interview and relocation expenses. Your inquiries and our referrals are CONFIDENTIAL. You may call TOLL FREE 1-800-438-1063 (in N.C. 919-378-[illegible]) or mail us a complete chronological resume or work history (handwritten updates are fine) – your current salary, career salary and geographic objectives.
WE PRACTICE AFFIRMATIVE ACTION

STO FOX personnel consultants P.O. BOX [illegible] • GREENSBORO, N.C. 27405

DATA BASE TECHNICIAN

RENO, NEVADA - PUBLIC UTILITY

Sierra Pacific Power Company, serving the Reno/Lake Tahoe area, is currently seeking a Data Base Technician to work with the Electrical Systems Engineer in the Power Supply Department maintaining card and tape data bases on energy control systems. Specific duties will include system operation and restart as well as Harris Card and Data Base maintenance, Harris tape backups and HP Data Base Maintenance.

The ideal candidate for this position will have a working knowledge of Fortran, Software reconstruction, maintenance and troubleshooting. A definite plus would be knowledge of Harris/5 computers, HP 1000F, SEL 6750 or 8750 or Cyber 170. The applicant selected for this position will spend the first year of employment out of the Reno area at the vendor's location developing the software package and will receive per diem expense in addition to salary. After completion of this training, transfer to Reno will be effected.

We offer an excellent salary and benefit package. If interested, submit resume to:

PROFESSIONAL STAFFING

SIERRA PACIFIC POWER COMPANY
P.O. Box 10100 • Reno, Nevada 89520
An Equal Opportunity Employer M/F/H/V

Title: Computer Specialist IV

Responsibilities: Maintenance of operating systems. Installation of networking software. Evaluation of applications software tools. Provide leadership in use of applications software tools.

Minimum Qualifications: B.A. degree and 5 years experience; knowledge and experience in operating systems, experience in system design.

Salary: $[illegible] - $[illegible], starting salary normally not to exceed $[illegible].

Application Deadline: July 13, 1984

Send Resume Directly to: William Conroy Jr., Associate Director, Kingsbury Hall, University of New Hampshire, Durham, N.H. 03824

The University of New Hampshire is an EEO/AA Employer

NORTHERN MINN ASSEMBLY $25-60,000

If you love hunting & fishing and desire greater compensation for your efforts, this firm has the position you want. Requires 4 yr degree in Elec Eng'g or Comp. Sci. and 2 yrs on-the-job programming and analysis in ASSEMBLY and higher-level language. Salary depends on experience. Job # [illegible].

MARK DAVID or TIM SMITH
ROBERT HALF
3636 IDS Center
Minneapolis, MN 55402
(612) 339-[illegible]

FLORIDA CONNECTION

[illegible] QUALITY –

All Expenses Paid

Our clients, in urgent need of your expertise will pay all your expenses in relocating you to an area of Sun & Fun, No State Tax. Average Temperature 78°

TELECOMMUNICATION PROGRAMMERS
PROGRAMMER ANALYSTS
SYSTEMS ANALYSTS
SYSTEMS PROGRAMMERS
DATA BASE ANALYSTS

NCC SHOW ISSUE
July 9, 1984
***(Classified closing June 28, 1984)

NCC WRAP-UP ISSUE
July 16, 1984
(Classified closing July 6, 1984)

Have we got a tip for you! Do you need high quality job applicants or need to find buyers for your computer equipment? Our coverage of the National Computer Conference could be the answer to your problems. Again this year we have bonus distribution of Computerworld at the show. That bonus distribution means that over 500,000 readers will see your ad. Computerworld is offering you the chance to reach who you need to, along with giving you the insight to the happenings, speeches, and current news of the show. Information you should know!

Don't miss the opportunity of a lifetime.

For more information call or write:

COMPUTERWORLD
Classified Advertising
375 Cochituate Rd, Box 880
Framingham, MA 01701

800-343-6474
(617)-879-0700

*** PLEASE NOTE EARLY CLOSE!

DEVELOP YOUR FUTURE AT CANDLE CORPORATION...

CANDLE CORPORATION is a multi-national, high-technology company and developer of OMEGAMON®. We currently have openings for the following software professionals.

Software Quality Analyst

We need an experienced software developer to become a lead member in a group responsible for the creation and implementation of innovative software test procedures. This position will work with some of our top software developers and will help us build our quality team.

Qualified applicants will have strong assembler language skills and preferably an in-depth knowledge of operating systems software, CICS or IMS. Excellent analytical skills, communication abilities and enthusiasm necessary.

Software Engineer

Will contribute to the design, implementation, test and enhancement to our CICS performance monitor for DOS.

Qualifications include 6 or more years experience in DOS/VSE, knowledge of DOS internals and structure and flow. Familiarity with supervisory services and access methods. A working knowledge of CICS or VM is a plus.

CANDLE'S state-of-the-art environment provides plenty of room for personal and professional growth. In addition, we offer an excellent compensation and benefits portfolio. Please call or send your resume to:

Joel Prescott
Candle Corporation
10600 Wilshire Blvd. 90024
Los Angeles, CA 90024
(213) 207-1400

Equal Opportunity Employer

!Candle®

SYSTEMS AND PROGRAMMING MANAGER

Saudi Arabia
— high earnings + technical interest

Allied Medical Group are leading British health care consultants to the Riyadh Al-Khaj Hospital Programme. The Programme consists of two modern, superbly equipped and mainly British staffed hospitals – the 600 bed Armed Forces Hospital in the capital city of Riyadh and a 55 bed satellite hospital, some 50 miles south at Al Khaj.

The Computer Department provides support to both hospitals and satellite clinics. The current networked configuration includes: two Hewlett Packard 3000/III's; a Hewlett Packard 3000/33; a Honeywell L66/10; and a Cyber 18-20 plus peripheral micro computers. This configuration will soon be upgraded to include an H-P 3000 Series 48 and additional remote links. The network supports a mixture of on-line and batch systems for patient management, pharmacy, laboratory and financial/administrative applications.

Reporting to the Director of Computing Services, the Systems and Programming Manager will be expected to play a leading role in the development of a long-term computing strategy as well as being responsible for the implementation of that strategy and support of existing systems.

You will need a Bachelors Degree and have at least 10 years experience including either 3 years as a Systems and Programming Manager, or 5 years project management experience. Extensive health care experience in a large hospital environment, including system implementation and experience in the preparation of strategic plans, are essentials. Membership of a data processing and/or health care professional organisation would be advantageous.

Apart from an excellent salary and terminal bonus, this married status two year contract basis post attracts a comprehensive benefits package, including: free, fully furnished accommodation; four weeks leave for every six months service; free air fares (including leave flights) and extensive welfare and recreation facilities.

For further details, please write enclosing a c.v. and quoting Ref: P/RKH3055/CWO to: Kate Vincent, Personnel Officer, Allied Medical Group, 12/18 Grosvenor Gardens, London, SW1W 0DZ, England.

AM **Allied Medical Group**

IMS - CICS

For professional and geographic fulfillment, the Sunbelt is where it's at. Enjoy a challenging work environment in "State-of-the-Art" installations and in your leisure time enjoy a life-style that blends with a temperate climate. Our Fortune 500 clients are seeking qualified EDP professionals with a minimum of one (1) year experience in an IBM environment. Client companies assume all fees including interviewing and relocation costs.

DATA BASE	TO
Data Base Administrator(s) IMS IDMS	$45K
Data Base Analyst(s)	$40K
Sr. R&S Systems Prog(s)	$40K
IMS Systems Prog(s)	$35K

APPLICATIONS	TO
Project Leaders IMS, VS, MFG, COBOL	$38K
Project Leaders MFG	$38K
Sr. Systems Analyst(s) IMS, VS, COBOL	$34K
Systems Analyst(s) CICS, MFG/Process	$34K
Programmer Analyst(s) IMS, VS	$33K
Programmer Analyst(s) COBOL/ALC	$33K
Programmer(s) COBOL/ALC, DOS/OS	$25K

TECHNICAL SUPPORT	TO
Sr. Systems Prog(s) MVS-SYSGENS	$40K
Systems Prog(s) OS, SYS-MVT,SYSGENS	$36K
Systems Prog(s) OS/DOS, ALC, CICS	$25-34K

Send your resume in confidence or call collect.

"Steve" Stevenson, Partner

Jim King and Associates

1040 Gulf Life Tower/Jacksonville, Florida 32207
(904) 399-7371

SENIOR PROGRAMMER/ANALYST

CarboMedics is an internationally respected manufacturer of medical implant devices located in Austin, Texas. Austin is the fastest growing, high technology center and is known for its high quality of life.

CarboMedics will be converting to ASK/IP and needs someone to assist in implementation as well as design and program additional systems which will be integrated with ASK's image database. Long range MIS goals include integration with CAD/CAM, downloading information to PC spreadsheets, bar coding, and office automation.

Ideal candidate will have 2-4 years with a manufacturing, AP, GL, and order management software package plus a practical and realistic understanding of how manufacturing companies operate so they can understand users needs and concerns.

CarboMedics can offer a competitive salary, and an extensive benefit package in the beautiful Texas Hill Country! Please forward a resume to our Personnel department or call collect:

CMI

Ms. Carol J. Vaughn
CARBOMEDICS, INC.
1300 East Anderson Lane
Austin, Texas 78752
(512) 837-6811

Kellogg's

SYSTEMS OPPORTUNITIES

Kellogg Company, one of the world's leading food manufacturers, is expanding its Corporate Information Services Division, resulting in the addition of key opportunities for:

SYSTEMS MANAGER (TWO OPENINGS)

Both positions will plan, coordinate, and direct the design, development, and maintenance of computer systems in assigned functional areas of company operations. One functional area is in accounting and financial applications. The other functional area is in manufacturing, science, and quality assurance applications. Both positions require an individual with formal training (Master's Degree preferred) plus a minimum of seven years' technical experience in systems analysis, systems design and the use of various computer programming tools.

SYSTEMS ANALYST - METHODOLOGY SPECIALIST

This position is responsible for establishing and maintaining a systems development methodology, including documentation, quality assurance, and data and program security standards while functioning as the major liaison with internal/external auditors. A Master's Degree is preferred with a minimum of five years' experience as a business systems analyst.

These responsible and challenging positions are located at our Corporate Headquarters in Battle Creek, Michigan, and are accompanied by a competitive salary, company-paid benefits and liberal relocation incentives.

If you are qualified and interested, please send a letter and/or resume in confidence to:

Bill Steele, Manager
Corporate Employment Services
KELLOGG COMPANY
235 Porter St.
Battle Creek, MI 49017

An Equal Opportunity Employer M/F/H/V

ROMAC.

FLORIDA
MEET THE CHALLENGE

Florida's tremendous growth has created unique opportunities in state of the art environments for motivated, skilled data processing professionals.

PROGRAMMERS, ANALYSTS, SOFTWARE ENGINEERS, SYSTEMS PROGRAMMERS

UNLOCK YOUR POTENTIAL

Romac & Associates of Florida, Inc.

One Tampa City Center, Ste. 2360-C, Tampa, FL 33602 (813) 228-8327

800 W. Cypress Creek Rd. Ste. 305-C Ft. Lauderdale, FL 33309 (305) 968-0811

TANDEM

Expertise?

Call or send resume to:
Mr. Neil J. Owrutsky
Director, Information Services

[redacted]

1951 Kidwell Drive, Suite 400
Vienna, VA 22180
(703) 556-0600

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Bendix Field Engineering Corporation

A unit of Allied Corporation, our skills and innovation reach around the globe. We are currently seeking highly skilled Data Systems Specialists to assist in the programming and analysis of the Saudi Arabian Air Traffic Control System.

DATA SYSTEMS SPECIALIST
(Programmer/Analyst)

Let your skills take you to SAUDI ARABIA

The position requires, as a minimum, five (5) years programming/analysis experience to include CMSII, COBOL and some knowledge of MICRO. Individual should possess a Bachelors Degree in Mathematics or have a strong mathematics background. Experience should include programming and analysis in higher level assembly language as pertains to scientific or Air Traffic Control Systems applications.

At BENDIX FIELD ENGINEERING CORPORATION, we reward skills and dedication. Our employees in Saudi Arabia receive competitive salaries, overseas allowance and completion bonuses. We also offer free transportation, two leaves per year, subsidized meals, and free housing. For more information on how to become a part of this exciting organization, forward your resume or call: TOLL FREE: 800-638-2988, Mon.-Fri., 8AM-4PM(ET), Bendix-ATC-HASSA, 9017 Red Branch Rd., Columbia, MD 21045.

an equal opportunity employer m/f/v

ALLIED Bendix Aerospace

MANAGER
Systems & Programming

Westwood Pharmaceuticals, Inc., a subsidiary of Bristol-Myers Company, and a leading researcher, marketer and manufacturer of dermatological products, currently has an opening in Information Services for a Manager, Systems and Programming.

Responsibilities in this position include planning, designing, programming, implementing, and maintaining business information systems. Project areas include Finance, Sales/Marketing, Manufacturing, and Human Resources.

This position requires an undergraduate degree in Business or Computer Science with a proficiency in systems design and COBOL programming plus significant project management experience. A working knowledge of IMS DB/DC is an added plus.

We are a leader in the dermatological field and invite you to grow with us. Our compensation and benefits package is highly competitive. For confidential consideration, please submit resume with salary requirements to:

Supervisor, Human Resources

WESTWOOD
PHARMACEUTICALS INC.
A Division of Bristol-Myers Company
100 Forest Avenue Buffalo, N.Y. 14213
An Equal Opportunity Employer M/F/H/V

DP PROFESSIONALS

TAKE YOUR CAREER BEYOND THE HORIZON

You'll find a totally new and different environment for yourself and your career at Blue Cross and Blue Shield of Florida, Inc.

Internal promotions and recent expansion creates several openings for EDP professionals who desire the challenges and rewards of a state-of-the-art technological environment where optimum opportunities for career advancement abound.

We seek highly motivated professionals with 3-5 years structured project development programming experience on IBM equipment, coupled with a working knowledge of COBOL, JCL, TSO, MVS/OS and IMS DB/DC or related background.

Working at our corporate headquarters in Jacksonville, Florida you'll realize an excellent salary and benefit package in a city that offers many year-around recreational and cultural activities with a lower cost of living. To investigate this opportunity, forward a resume with salary history today.

Jeannette Sajda
Corporate Recruiter

Blue Cross and Blue Shield of Florida, Inc.
P.O. Box 1798
Jacksonville, Florida 32231
Equal Opportunity Employer m/f/h/v

MGR. MIS TECH. SUPPORT

FORTUNE 500 mfg. firm in Northern PA req. strong mgr. with effective interpersonal skills. Will mgs. sys. progs. & T/P analysts. Complex conversion from DOS to MVS underway. Highly visible position requiring excellent tech. & mgr. skills. To $60,000.

ROBERT HALF OF BUFFALO, INC.
420 Main Street
1310 Liberty Building
Buffalo, NY 14202
(716) 842-0801
Personnel Agency

DATA PROCESSING INSTRUCTOR

Full time permanent position beginning August 1984. IBM system and CICS experience preferred. Bachelors degree plus recent relevant work experience required. Send letter of interest and resume to:

Personnel
Intermediate School District 917
Dakota County AVTI
1300 148th Street East
Rosemount, MN 55068
(612) 423-8231
EOE

SYSTEMS ENGINEER EDP

Analyze, design, and implement EDP systems, to provide capability for large scale AI-based, end-user graphics systems background. Salary $33,000. Resume only, to:

Robert Gray
Job Service
Washington County
Government Center
Tower Hill Road
Wakefield, RI 02879

COMPUTER SCIENTIST

Position with small software research/development company. Applicant must have an MS or equivalent in computer science and at least 6 months experience in using UCSD Pascal on the IBM PC in the development of text processors and graphics oriented computer-based learning material. Salary from $22,000 per annum DOE for 40 hour week. Application by resume only to New Mexico Employment Security Department, 226 S. Alameda, Las Cruces, NM 88004. Tel. 505-526-5513. Refer to Job Order Number 282. Deadline July 25, 1984. An equal opportunity employer.

UNIX
National Registry of UNIX* Job openings & professionals
P.O. Box 19849, Dept. CWU
Houston, TX 77224
Please send resume.

VAX PROGRAMMER/ ANALYST

Expanding software firm has an excellent opportunity for an experienced VAX professional with BS degree and 2+ years of commercial applications experience. Salary to $32K. Send resume to Personnel, P.O. Box 37130, Raleigh, NC 27627.

Programmer Analyst

Distribution company, in the greater Cleveland, OH area, requires a Programmer Analyst to perform all phases of systems development in our dynamic systems environment.

A Computer Science degree with 2-4 years hands-on experience in the use of a high level language is required.

This is an excellent opportunity for a qualified individual who is seeking growth within an environment that utilizes on-line business systems, information center languages, microprocessor networks and a high degree of user interface.

We offer a comprehensive benefits plan and compensation commensurate with your ability. Candidates interested in this challenging opportunity, should forward their resume and salary history, in confidence to: Personnel Manager, MATCO TOOLS CORPORATION, 124 West Aveaue, Tallmadge, Ohio 44278. We are an equal opportunity employer.

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $128.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $256.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us,) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired: _____ columns wide by _____ inches deep.

Issue Date(s): _____

Section: _____

Signature: _____

Name: _____

Company: _____

Title: _____

Address: _____

Telephone: _____

Send this form to:

COMPUTERWORLD
CLASSIFIED ADVERTISING,
375 Cochituate Road, Box 880,
Framingham, MA 01701

RPI

Rensselaer Polytechnic Institute, a major technical university near Albany, New York has the following positions available in its Telecommunications Division:

Operations Manager

You will be responsible for on-going projects and digital switching, LAN, X.25, Ethernet, microwave, fiber-optics, etc. This would include maintaining of voice and data communications of the Institute, analyzing communications needs, and ensuring all operations are efficient and cost effective. Qualifications include a Bachelor's degree in Electrical Engineering and a minimum of 5 years' related experience in high level data communications applications or equivalent. Must have management ability, knowledge of DP systems, project planning, coordination and control experience with a good working knowledge of voice communications systems.

Communications Analyst

Will analyze communications requirements, provide detailed network specifications and develop or modify communications software. Requires a Bachelor's degree in Computer Science, Engineering or equivalent and at least 2 years' experience in voice and data communications. Familiarity with IBM, Prime, DEC, Ethernet and X.25 extremely desirable.

Send cover letter and resume, indicating desired position, to: Employment Manager, Rensselaer Polytechnic Institute, 110 8th Street, Troy, NY 12181.

RPI is an equal opportunity/affirmative action employer

At CIBER Your Career Opportunities Include Location

With many companies, the prospect of an exciting career with long-range opportunities is limited by one element - location. CIBER knows that the environment in which you work and live affects your personal satisfaction. A career with our rapidly-expanding consulting firm will allow your future to take shape in a choice of data processing markets.

Our employees are salaried and receive company paid benefits including relocation. If you have a minimum of 3 years experience, we can offer you a wide range of technical opportunities in diverse industries using the latest systems and computer technology.

Openings are currently available in the following locations for data processing professionals who are experienced in these preferred skills:

Denver
COBOL, CICS, OS/DOS
IDMS, DL/I
Hogan Systems
HP3000, ADABAS

Sacramento
COBOL, Online Systems
ADABAS/COM-PLETE
INQUIRE, CICS
IDMS, ADS/O

Detroit
COBOL, IMS DB/DC
IDMS, ADS/O
FOCUS, CICS
Burroughs TOTAL

Dallas
COBOL, CICS, DL/I
Insurance Systems
Financial Systems
TANDEM, Pathway

St. Louis
COBOL, CMS/RAMIS
CICS, TOTAL
IMS DB/DC
HP3000

Houston
COBOL, PL/1, IMS DB/DC
IDMS, ADS/O
ADABAS/NATURAL
CICS, VSAM, FOCUS

Phoenix
COBOL, PL/I, ALC
CICS, IMS DB/DC
Hogan Systems

Atlanta
COBOL, CICS
Financial Systems

Chicago
COBOL, IMS DB/DC
ADABAS/NATURAL
STRADIS, CICS

CIBER
An Ethic Of Excellence

67 E. Weldon, Suite 121
Phoenix, Arizona 85012
(602) 234-0411

An Equal Opportunity Employer M/F

Associate Director of University Computing

Eastern Michigan University invites nominations and applications for an Associate Director of University Computing to oversee the development, installation, maintenance and improvement of basic computer software and systems, and coordinate programs for administrative Divisional users. Duties also include providing staff support to the Executive Director of University Computing as well as assuming all duties of the Executive Director in his/her absence.

Minimum qualifications include:

- A Master's degree in Management Information Systems or related field, or the equivalent combination of education and experience
- Five to eight years of progressively responsible experience, including three to five years experience performing programmer/analyst or systems design duties and two to three years experience performing data base administration or manager of application systems development duties
- Experience installing major application systems which utilize data base and data communication technologies, preferably in a higher education setting.

Salary range: $28,564 - $43,417 plus comprehensive fringe benefits. Starting salary commensurate with qualifications.

Applicants must submit by July 2, 1984, a standard application package, available by contacting Chairperson, Search Committee for Associate Director of University Computing:

EASTERN MICHIGAN UNIVERSITY

310 King Hall - CW
Ypsilanti, Michigan 48197
(313) 487-3430

An Affirmative Action/Equal Opportunity Employer and Educational Institution

DATA ANALYST AUBURN UNIVERSITY

Qualifications:

Bachelor's degree required with Master's degree desirable. Three years experience working with a major data base management system, preferably TOTAL and/or TIS, in a university environment. Candidate must have excellent communication skills, both written and verbal; the ability to effectively interact with people at all organizational levels; and be able to manage a project from inception to completion with a minimum of supervision.

Duties:

Responsibilities include working with user departments and application development groups to determine the data requirements for specific projects. Developing standards and procedures regarding data usage and retention. Providing general assistance and technical support to the application development staff, as well as the user community.

Send a letter of application and a current resume to:

Reuben Fleming
Director, Data Base Administration
Division of University Computing
144 Parker Hall
Auburn University, AL 36849
Application Deadline: July 15, 1984
Auburn University is an Equal Opportunity Employer

PROGRAMMER/ANALYSTS

SYSTEM/38 RPG/CL
SERIES I EDX/EDL
IBM PC

Fast-growing company in rural country setting needs several experienced programmer/analysts for development of manufacturing, retail, publishing and other systems. The successful candidates will have 1 or more years hands-on experience on one or more of the systems named above, and 3 or more years data processing application development experience. Principals only, please.

Please send resume and salary requirements to:
MIS DIRECTOR
RENOVATOR'S SUPPLY, INC.
MILLERS FALLS, MA 01349

ROCKY MOUNTAIN OR NATIONAL

Software Engineers	LAN, SNA, AI, CAD, Micros
Systems Engineers	C I, Satellite Communications
Database Consultants	DBMS, IMS DB/DC, RAMIS
Computer Programmers	UNIX/C, CICS, VTAM, MVS
Systems Analysts	IBM, DEC-VAX & PDP, HP, CDC

Contact: Margarete Kolb
CAREER MARKETING ASSOCIATES
7100 East Belleview #206
Englewood, CO 80111
(303) 779-8890

Visiting San Francisco!

Let us know when you are arriving and we may arrange that you stay forever!

If you are an experienced Data Processing Professional with skills in Large Systems or Minis, Data Base or On-Line Systems, consider a move to the beautiful San Francisco Bay Area.

LOGICAL OPTIONS
[illegible] Agency [illegible]
One Market Plaza, Spear Tower, Suite [illegible]
San Francisco, CA [illegible] • [illegible]

PROGRAMMERS
OUTSTANDING FLORIDA OPPORTUNITY!

PICK operating system experience is your key to a [illegible] opportunity with our fast paced and growing Florida corporation. BASIC programming language experience on a [illegible], Ultimate, Prime or similar minicomputer system is a definite plus.

WE OFFER EXCELLENT STARTING SALARIES COMMENSURATE WITH ABILITY AND EXPERIENCE. RAPID ADVANCEMENT IS ASSURED, BASED ON CONTRIBUTIONS.

Positions include outstanding benefits, full relocation expenses, [illegible] training and pleasant working conditions in our new [illegible] located data center.

If you are ready for challenge and increased responsibility, please submit resume in complete confidence.

Reply to CW-[illegible]
Computerworld
Box [illegible]
Framingham, MA 01701

POSITION ANNOUNCEMENTS

MANAGEMENT INFORMATION SYSTEMS

MGM/UA Entertainment Co. is entering a period of rapid expansion and new development in MIS. Priority new development goals in the first year include installation of Cullinet's General Ledger and Accounts Payable packages, a Film Distribution System, Producer & Location Accounting Systems, and a new MGM Laboratory System.

PROJECT LEADER

Solid background leading a project team in the analysis and implementation of a complex General Ledger System utilizing IDMS, MVS, and ISO/ISPF

SYSTEMS ANALYST

Requirements include 2-3 years systems development experience using structured methodology with strong macro-level CICS knowledge. Film Distribution experience a plus.

SYSTEMS PROGRAMMER

Requires solid MVS or CICS technical skills, with expertise in debugging, problem resolution, network design and tuning. Prior conversion experience from DOS/VSE to MVS, plus ACF/VTAM, ACF/NCP a plus.

COBOL PROGRAMMER

Prior IDMS or CICS programming experience for a wide range of business applications in an IBM/OS and DOS environment. Knowledge of file access methods, job control language, batch and online systems preferred.

LEAD COMPUTER OPERATORS

Must possess a minimum of 2 years experience operating large scale IBM mainframes and peripherals, utilizing OS/MVS/XA or OS/MVS/SP. Knowledge of communications network and DOS/VSE operating system highly desired.

We are offering highly competitive salaries and a comprehensive benefits package, including Medical, Dental, Pension and Stock Purchase Plan. Please submit resumes with salary history in confidence to:

MGM/UA Employment Office, Dept. HST
10202 W. Washington Blvd.
Culver City, CA 90230

An Equal Opportunity Employer M/F/H/V

DATA DICTIONARY ORLANDO, FLORIDA

Technical consultant experienced in Data Dictionary installation & support. Preference will be given to those with Data Manager experience. Well versed in use of IMS DB/DC, OS MVS JCL, TSO, SPF, Panvalet, and IBM utilities. Knowledge use of dictionary throughout development life cycle. Good communications skills vital.

We can offer you an excellent salary and a superb package of benefits including fully paid health & dental insurance for you and your family, tuition reimbursement, and a unique performance sharing plan. You would also enjoy Central Florida's beautiful year-round climate, very affordable housing, and a challenging work environment.

Please forward your resume or informal description of your background in complete confidence to:

MARTIN MARIETTA DATA SYSTEMS

P.O. Box 13385-A, MP-357
Orlando, Florida 32859-0385

WHERE THE FUTURE IS HAPPENING TODAY

An Equal Opportunity Employer M/F/V/H

MARTIN MARIETTA

Title: Computer Specialist IV - Computer Services

Responsibilities: Provide leadership in MIS systems design, work closely with the management of the University in the area of financial systems. Supply project leadership especially in financial areas. Communicate systems operation to users.
Minimum Qualifications: Bachelors degree and 5 years experience; knowledge and experience in systems analysis. Education in and practical experience with financial systems.
Salary: $22,[illegible] - $35,[illegible], starting salary normally not to exceed $[illegible].
Application Deadline: July 13, 1984
Send Resume Directly to: William M. Conroy Jr., Associate Director, [illegible] Hall, University of New Hampshire, Durham, New Hampshire 03824

The University of New Hampshire is an EEO/AA Employer

CREAM OF THE CROP
SYSTEMS PROGRAMMERS
PROGRAMMERS/ANALYST

I'm SELECTIVE about the companies and candidates I choose to represent. My client companies deserve the best and so do you! Immediate openings/SOUTHEASTERN locations.

Systems Programmers
MVS, CICS, IMS, or [illegible] .... to $46,000
Programmers Analysts
COBOL, CICS, IDMS or ADABAS .... to $38,000

Let's get the ball rolling! Call or write:
BRENDA CAREY
PERSONNEL PLACEMENT, INC.
P.O. BOX 1816
BURLINGTON, NC 27216-1816
(919) 584-[illegible]

SEATTLE

Join the Swedish Hospital Medical Center's innovative MIS team and experience the great northwest life style.

The northwest's major medical center in metropolitan Seattle offers a challenging career opportunity for COBOL, CICS application Programmer/Analysts. The medical center's state-of-the-art technology and professional environment make this position an exciting and challenging opportunity for an individual with a minimum of 3 years experience in design and programming of online systems in the following environment:

- COBOL
- CICS
- VM/DOS/VSE
- VSAM
- DL/1

We offer a comprehensive benefit program and salary commensurate with experience and qualifications. Swedish Hospital Medical Center is an equal opportunity, affirmative action employer. Please submit resumes to the attention of:

Mr. Jim Bergstrom
Director of Data Processing
Swedish Hospital Medical Center
747 Summit Avenue
Seattle, WA 98104

FLORIDA ELECTRONIC PRINTING UNIX & C

Megasem, a rapidly expanding computer manufacturer has openings in its new Tampa, FL facility for computer professionals who desire a challenging career in a state of the art development environment. Positions available: Sr. Systems SW Engineers (5 years UNIX and C), Systems SW Engineers (2 years UNIX and C), Digital Font SW Specialists, UNIX I/O Driver Analyst (Multibus exp. a plus), Sr. Systems Analyst (non-impact printing systems). If you are qualified for any of the above positions and are interested in an exciting opportunity, excellent benefits, and rapid advancement, please call collect to Rob Hufer at (813) [illegible]. Megasem, Inc., [illegible] North [illegible] Street, Tampa, FL 33610.

HOGAN SPECIALISTS
$29,200 to $42,875

Programmer Analysts, Project Leaders and Systems-Management for major clients throughout the country. Send resume or call collect.

Executive Personnel Consultants
[illegible] S. Mendenhall
Memphis, TN 38117
(901) 761-[illegible]

Software Engineer

Software and development primarily in health care industry, including hospitals, nursing homes, home care and clinics. Includes AP, AR, payroll, GL, inventory billings. Includes development of programs, demonstrations and technical training to customers. Also includes follow-up, testing and troubleshooting. Requires B.S. in Computer Science or Management Information Systems, plus 1 year experience. Also requires experience in program design and development, experience with [illegible], IBM PC and Convergent Technologies hardware. Must be familiar with IBM 38 Basic, Microsoft Basic, Pascal, and Assembly Language. 8-5 M-F 40 hr/wk. $[illegible]/yr. Submit resume to Microhealth Systems, 140 E. 9th Ave. Denver CO [illegible]. Attn: Rebecca Willis.

OPERATIONS RESEARCH ANALYST. To design and develop sophisticated computer systems and mathematical models for optimizing the efficiency of the scheduling and routing of vehicles. Must have M.S. in Operations Research. Must be conversant with computers and computer programming; also with data base management, particularly data base 2 on DOS environment. Forty hours per week, 8:30 a.m. to 5:00 p.m.. Salary $26,000 per year. Apply with resume to Mildred McGill, Ohio Bureau of Employment Services, 3136 Euclid Avenue, Cleveland, Ohio 44115. Job order number 0221607.

DALLAS
Systems Software
Mod 204 Internals

Local client needs individual with Mod 204 DB systems experience. Full relocation; fee paid. Salary open D.O.E.

2720 Stemmons Frwy., 1207F
Dallas, TX 75207, (214) 637-[illegible]

DATA PROCESSING CAREERS INC

COMPUTERWORLD CLASSIFIEDS WORK!

- **POSITION ANNOUNCEMENTS**
- **BUY SELL SWAP**
- **SOFTWARE FOR SALE**
- **SOFTWARE WANTED**
- **TIME & SERVICES**
- **REAL ESTATE**
- **BUSINESS OPPORTUNITIES**
- **SEMINARS/CONFERENCES**
- **BIDS AND PROPOSALS**

It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or a camera ready mechanical, stat or film negative of your ad, just call our adtakers at 1-800-343-6474. They will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at COMPUTERWORLD (telecopier service is available); note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with your insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Art Department will follow your suggested layout as closely as possible if you wish to send one.

Ad closing is every Friday, 6 working days prior to issue date.

Rates: Open rate is $128.10 per column inch. Columns are 2" wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs $256.20 per insertion. Additional space is available in half-inch increments. Some sample sizes and costs are shown.

1 col x 4" - $ 512.40
2 cols x 4" - $1024.80
2 cols x 5" - $1281.00
2 cols x 8" - $2049.60

Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld. Box Numbers are available, $15.00 per insertion.

To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call our office nearest you.

Boston - (617) 879-0700 or (800) 343-6474
New York - (201) 967-1350
Chicago - (312) 827-4433
San Francisco - (415) 421-7330
Los Angeles - (714) 556-6480
Atlanta - (404) 394-0758
TELECOPIER SERVICE - (617) 879-0700 or (800) 343-6474 ext. 410 or 451

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

Developing the world's most advanced systems software requires exceptional talent.

For 25 years, Applied Data Research has been the "driving force" in software development. Many of the innovations we introduced years ago, are now considered industry standards. Many of the software systems we are developing today, will no doubt become the standards of tomorrow.

Currently, ADR software development professionals are taking an innovative look at 4th generation systems software for IBM mainframe and personal/micro computer technologies. Individuals interested in associating themselves with this "world-class" development effort should be experienced in any of the following areas:

SYSTEMS SOFTWARE DEVELOPMENT

- 4th Generation Languages
- Data Base Management Systems
- Word Processing/Electronic Mail
- Decision Support Systems
- Performance Measurement/Capacity Planning
- PC/Mainframe Communications
- Operating System Extensions

TECHNICAL SUPPORT SERVICES

- CAI Courseware Developers
- Classroom Instructors
- Data Base Consultants
- MVS/DOS/VM Technical Support
- Systems Programmers (MVS/VTAM/NCP)
- Systems Analysts/Programmers (DB/DC)

Applied Data Research offers an excellent program for professional development, relocation assistance, and a compensation package which is fully commensurate with your education, experience and potential. For immediate consideration forward your resume or call Mr. Gary Johnson, (201) 874-9000, APPLIED DATA RESEARCH, INC., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540.

APPLIED DATA RESEARCH

An equal opportunity employer

Investigate the 140 immediate positions to elevate your career within the software engineering field. Positions are available in the East, Midwest and South. BSEE or BSCS is required, along with experience developing operational software for embedded computer systems.

You will receive a professional, "no-hassle" approach to advancing your career and you will be dealing with an industry leader serving since 1962.

For immediate action, send your resume with salary history and relocation preferences to Dale Mayhall or Michael Kite

BONE PERSONNEL, INC.
3000 Ft. Wayne Bank Bldg.
Ft. Wayne, IN 46802
219-434-4400

RESUMES
All Writing Needs

- Effective, professional
- For today's job seeker
- Free cover letter package
- Fast, reliable, confidential
- Creative & editorial services

FORD/YOUNG ENTERPRISES
P.O. Box 157
Villa Park, IL 60181
(312) 530-8816

Systems Programmer to maintain, update, and install system software, monitor and optimize system performance, troubleshoot hardware and software problems, and regulate and manage resource usage.

CICS heavily emphasized. DOS/VSE or IDCF helpful. COBOL background preferred. Superior programming ability required. Must work well with people in rapidly changing environment.

Experience in system development and Bachelor's degree, preferably in computer related field required. Mail letter, vita, and names of three references by 7/6/84 to:

Somerset County College
Personnel Department
P.O. Box 3300-C
Somerville, NJ 08876

An Equal Opportunity Affirmative Action Employer

Programmer Analyst, APL

Mediflex Systems Corporation, a leader in the development of Health Care Software Systems, is seeking a Programmer Analyst, for Atlanta, GA, to participate in the development and maintenance of financial budgeting and modeling products.

- APL experience required
- Financial applications experience preferred
- Bachelor's degree desirable

Mediflex will provide a comprehensive benefit program, generous salary, and relocation expenses. Please submit resume to:

Ted [illegible]
Mediflex Systems Corporation
[illegible] Grove Street
Evanston, IL 60201
Equal Opportunity Employer M/F/H

MEDIFLEX SYSTEMS

EDUCATION

UNIX AND C TRAINING
Applied Learning Workshops

INTRO TO "C" - Mon. July 16 - Fri. July 20
INTRO TO UNIX - Mon. July 23 - Fri. July 27
ADVANCED UNIX - Mon. July 30 - Fri. August 3
ADVANCED "C" - Mon. August 6 - Fri. August 10

Hands-on Environment
UNIX V.7 plus Berkeley features
Each Workshop Forty Hours

Please call for alternate scheduling:
above courses can be scheduled at your convenience

For registration call Andrew Volk
(617) 776-3500
AIRCO Computer Learning Center
5 Middlesex Avenue
Somerville, MA 02145

BUY - SELL - SWAP

DEC

RENT • BUY • UPGRADE • SELL

PDP, 11/03, 11/04, 11/23, 11/24, 11/34, 11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS • OPTIONS • SUPPLIES

11/24	1MB, Dual RL02, DZ11-A, Cabinet	IN STOCK
11/23+	256KB, Dual RL02, DZV11-C, VT102, license	$15,900
11/70	MOS & Core Configurations available	starting at $29,900
VAX 750	1MB, RUA81, TU80, DMF32, VMS	SPECIAL
VAX 780	2MB, 2RM05, DZ11's, TEE16, 600LPM Printer	$9,200/mo

Customized Configurations—Call With Your Request.

In Stock	Specials	In Stock
11/24-BC	RUA81-AA (NEW) $28,400	KT24
11/34A-YE	MS780-CA (NEW) ....$ 2,800	LA120-DA
SA11-FD	RP06-AA $11,800	MK11-CE
DH11-AD	LP11-VA ....$ 2,400	MS11-PB
DMF32		MS750-DC
DMR11-M		RH780
DZ11-E		RK06-EA
DZ-32AP		RL02-AK
FP11-A		RM03-AA
KDF11-AA		TS11-CA

CALL FOR OUR FREE CATALOG
DEC is the registered trademark for Digital Equipment Corp

BROOKVALE
800-645-1167 (NY) 516-273-

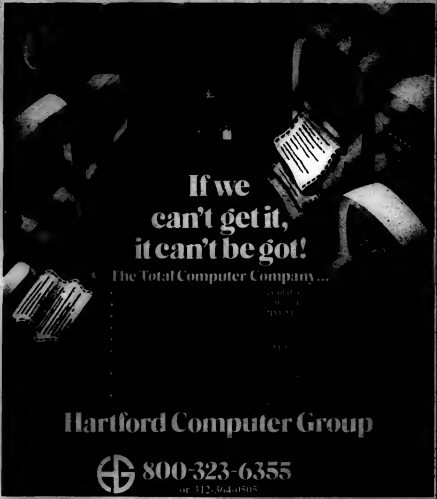
Control Data
126MB Removable Drives ..$12,900
Diskette Drives ....$ 1,495
Printers & Displays

SERIES I SPECIAL

New or Used
Immediate Delivery

IBM
4956 Processors
4967 200MB Disk Drives
All Peripheral & Features

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP



Inflation Fighter

Quality & Savings

Slightly used, Money Back Guarantee. Full Reels. All External Labels Removed Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel $4.95 ea.
1200' Reel $4.25 ea.
600' Reel $3.50 ea.

All Tapes with Hanging Seals

We pay freight on orders over 200 tapes. All orders shipped within 48 hours.

Call or Write

Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
[516] 842-8512

BUY

SERIES/1
Immediate
CASH
For Your
Series/1

Call toll-free

COI COMPUTER OPTIONS, INC. The best option.

WANG

MATRIX PRINTERS & VS WORKSTATIONS CHEAP!

Wang 2231, 2221, 5521 printers with interfaces: factory refurb from $1495, brand-new from $1395. Wang VS Workstations: 2246C 32K $2,600; 2266C 64K $3,395.

WANG M/A GUARANTEED; 15-DAY RETURN PRIVILEGE. IMMEDIATE DELIVERY! Equipment subject to prior sale.

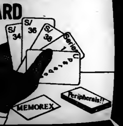
1-800-321-2986
ELECTRONIC OFFICE EXCHANGE, INC.
THE PRE-OWNED EQUIPMENT PEOPLE™

SYSTEM **34** ALL UPGRADES
Call Collect: 404-252-7480
S/1 S/38 Buy Sell
DATAMARC
Suite 320
Atlanta, GA

IBM PARTS
Same day or overnight
Call Collect
SAVE 404-252-7480 SAVE

DEPOT REPAIR
IBM 5251, 5291
CRT Assembly and Planer Boards
For Details Call:
(915) 692-9141
Russell Sullivan
Computech

PICK A CARD . . .
ANY CARD
and call
800
828-4227
we're ready
to deal.



CARLYN
COMPUTER SYSTEMS
5105Q BACKLICK ROAD, ANNANDALE, VA 22003

IBM SERIES 1 USERS

FORSYTHE McARTHUR ASSOCIATES, INC.
DEALER / LESSOR OF IBM
Computers and Peripherals
FOUNDED 1971

Home Office
Skokie
7500 Frontage Road
Skokie, Illinois 60077
312 675-8000

Branch Offices
Atlanta 404 953-0407
Detroit 313 540-0000
Milwaukee 414 785-8544

CDLA

SERIES 1
BUY SELL LEASE
Computer Brokers Inc.
Call Richard Crenshaw
Toll Free
800-238-6405
Also 901-372-2622

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

LEASE • PURCHASE • SELL

IBM SYSTEMS

- *Purchase-Lease Back*
- *Customized Leasing*
- *Upgrade Flexibility*
- *All models and peripherals*

612-941-0510

WINTHROP
FINANCIAL CORPORATION
computer sales & leasing division

6400 Flying Cloud Drive • Eden Prairie, Minnesota 55344 • 612/941-0510

Check us out ✓ for DEC

11X44 $23,000 ☐ RL02-AK $2,300 ☐ 11/23 Any Config.
VAX 750 $43,000 ☐ VAX 780 $131,000

All immediate and guaranteed, Everything from 11/23 to VAX

DATAWARE SYSTEMS LEASE
800-221-6318 30 Bay St S.I. N.Y. 10301 (212) 447-4911
TELEX 429364/TWX 710588-5736

FRONTIER COMPUTER CORPORATION Your Full Service Computer Dealer

DPD	S/34 S/36 S/38	Series/1	3270's
MAIN FRAMES PERIPHERALS COMMUNICATIONS — Call — FRED HANSEN	& RELATED PERIPHERALS — Call — RICHARD LORANG	• Systems Configured To Your Space • All Features and Peripherals Available • Depot Repair Service — Call — JOHN BURLEW RANDY STONE	3277 • 3278 3274 • 3276 3271 • 3272 — Call — TERRY SMITH

DALLAS: 214 - 330-7243 • HOUSTON: 713 - 560-7356
OUTSIDE TEXAS TOLL FREE 800 - 527-6436
4573 South Westmoreland, Dallas, Texas 75237 • 16151 Calmsley, Suite 103, Houston, Texas 77084

NEW RM80-AA DISK DRIVES ONLY $12,000

- 30-Day Delivery
- Standard Warranty

Want more data storage? Add another RM80 and save $8000 in the bargain. Your present MASSBUS controller can handle eight drives. So no need to buy a controller. No need for reprogramming either. Just hook up and go.

At this price, supplies won't last long. And quantities are limited. To reserve your RM80, call 800-343-4040, ext. 699 (call collect: in New Hampshire, 884-7990, ext. 699; in Alaska and Hawaii, 603-884-7990, ext. 699).

No other discounts apply. Phone orders only. Call today and save!

digital™

Offer good in U.S. only

WE BUY • SELL • LEASE

JOIN THE MANY FORTUNE 500 COMPANIES THAT UTILIZE IBM EQUIPMENT FROM TEXCOM... THE IBM SPECIALISTS

1331 1341 • 1361 1381

We buy, sell or lease • 2, 3, 4 year leases
WE'VE GOT IBM PERIPHERALS

3803	3375	3880	3350	3203	3811
3420	3360	3340	3370	3211	3262

IBM S/34 • 36 • 38

All upgrades available now • 1, 2, 3 year leases
We'll take S/34 trade-ins
WE'VE GOT ALL IBM PRINTERS AND TERMINALS
PLUS 3864 MODEMS NOW.

SERIES 1

All features and peripherals • Convenient leases
We buy, sell or trade

WE WANT TO BUY
IBM PC'S — IBM XT'S AND
IBM DISPLAYWRITERS

TexCom

CALL TOLL FREE: 1-800-633-9119
SAN ANTONIO (512) 349-8956
MEMPHIS (901) 756-7055

Want to Buy
5291, 5251, 5256
IBM Planar Boards
$100 each
For Details Call
(915) 692-9141
Russell Sullivan
Computech

VAX SYSTEM
TOTALLY INTEGRATED
80 Characters Per Second Letter Quality Parallel Printer
$1,000
6250 TH-Density Drive With Formatter And Cabinet
$25,000

MANDERS COMPUTER SOLUTIONS INC.
5680 Havana, Suite 5A
Denver, CO 80239
303-373-4320

PLUS PLUS PLUS PLUS PLUS PLUS PLUS PLUS PLUS PLUS PLUS PLUS

FOR DEC
CALL SCHERERS
11/23-BE 11/23+ 512 KB
BRAND NEW 40% OFF $3,995.
(614)889-0810

STC
TAPE/DISK
BUY · SELL · LEASE
408, 241-3677

Researching all your options will show you that your best source is COMPUTERWORLD

Computer Merchants inc

GREELEY AVE CHAPPAQUA NY 10514

MARKETPLACE UPDATE

amdahl amdahl

AVAILABLE

Model 6A, 6B, 7A, 7B
MEMORY AND CHANNELS
FOR ALL AMDAHL
470 SYSTEM MODELS
Sale • Lease • Sublease

470V/7 OR 470V/8
With
•Hardware Measurement Interface
•Data Streaming
Channel-to-Channel Adapter
Sale • Lease • Sublease

470V/7A 8x8 Sublease Now
470V/7 12x12 Aug - Sept
470V/8 16x16 Sublease Now

amdahl amdahl

WANTED

5850/5860 32x32
470V/8 16x16
470V/7X 16x16

NOW
EXPAND THE
MEMORY and
CHANNELS on your
470V/X SYSTEM
at a special price!

CONTACT
Charlie Barry or Tom Starr at
(612) 933-8000

10237 YELLOW CIRCLE DRIVE • MINNETONKA, MINNESOTA 55343-9143 • (612) 933-8000 • TLX

WHEN YOU'RE READY

TO BUY • SELL • TRADE • LEASE

VAX-UBUS-QBUS

DEC TERMINALS

D C R

DIGITAL COMPUTER RESALE
713/445-0082
600 KENRICK • C-22
HOUSTON, TX 77076

MARION

BUY • SELL • MAINTAIN

IBM SYSTEM/34/36

- PROMPT DELIVERY
- ALL SYSTEMS 34 ARE FULLY RECONDITIONED
- ALL SYSTEMS 34/36 CONFIGURED TO YOUR NEEDS
- PERIPHERALS — NEW AND USED
- UPGRADES AND FEATURES DELIVERED AND INSTALLED
- LONG TERM LEASES AT COMPETITIVE PRICES
- SHORT TERM RENTALS
- TRADE-INS ACCEPTED
- GUARANTEED WMC or IBM MAINTENANCE

A PHONE CALL CAN SOLVE ALL YOUR EQUIPMENT PROBLEMS

TALK TO US . . . NEW JERSEY (201) 343-4554
CONNECTICUT (203) 758-2400
PITTSBURGH (412) 864-8612

WILLIAM MARION CO. INC

WANTED

NEWMAN

FOR SALE
New and Used Shugart SA 800/801 Floppy Disc Drives
Inquire to CW-B4024
Computerworld
Box 880
Framingham, MA 01701

1 X 6 STC 3650 Tape Drive
6250/1600
$35,000
Available 6/1/84
Contact Dan Jones or Gene Berning
(213) 390-6261

IBM Displaywriters

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 508 Robert E. Lee Building, Jackson, MS 39201 for the following data processing equipment and services:

Request for Proposal No. 982, due 3:30 p.m., Thursday, July 19, 1984 for the acquisition of a computer system to replace a Xerox Sigma-9 for the University of Southern Mississippi.

Request for Proposal No. [illegible], due 3:30 p.m., Thursday, July 5, 1984 for the upgrade of a DEC PDP 11/44 for Hinds Junior College District to include 2780/3780 remote batch telecommunications protocol.

Request for Proposal No. 984, due 3:30 p.m., Tuesday, July 10, 1984 for the lease-purchase of a turnkey pharmacy system for the Mississippi State Hospital.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Dorothy Hooper or Elaine Kinman, State Central Data Processing Authority 601/359-1395

WANG WORD PROCESSORS
AT THOUSANDS OFF!

Guaranteed, remanufactured WPS 20, WPS 30 and Wangwriters available for immediate delivery. You don't pay a cent till Wang installs and places equipment under service contract. 15-day return privilege. Buy Lease Rent!

For Free Info and fast answers call toll-free:

1-800-321-2986

ELECTRONIC OFFICE EXCHANGE, INC.
Dept. SC3CWD • Box 7337 • Ann Arbor, MI 48107

SELLING?

More than half a million active computer people read COMPUTERWORLD each week. That means:

- **YOU can reach them efficiently in COMPUTERWORLD Classifieds.**
- **YOU can find buyers for discs and DEC's, terminals and timesharing, software, System 370's, and more.**
- **YOU can join the THOUSANDS OF ADVERTISERS who use our classifieds because they get RESULTS.**

To place your ad, or to get a rate card with complete details on COMPUTERWORLD Classifieds, call or write:

Classified Advertising
COMPUTERWORLD
P.O. Box 880
Framingham, MA 01701

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

CMI

AMERICA'S LEADING SPECIALIST SERVING THE USED MARKET

Absecon, NJ (609) 645-7282
Boston, MA (617) 367-5795
Chicago, IL (312) 693-2750
Dallas, TX (214) 385-[illegible]
Encino, CA (818) 789-0113
Houston, TX (713) 780-7460
Irvine, CA (714) 752-8443
Lebanon, TN (615) 449-6839
Miami, FL (305) 448-2966
Monmouth Beach, NJ (201) 222-0750
Tampa, FL (813) 273-8828
Frankfurt, Germany Telex: 414561 LCO D
Montreal, Quebec (514) 871-1121
Nyon, Switzerland Telex: 27369 CMI CH
Paris, France Telex: 214083 CMI FR
Toronto, Ontario (416) 842-3995
(416) 362-6408
Vancouver, B.C. (604) 685-6196
Windsor, Ontario (519) 973-3919

CMI FINANCIAL SERVICES GROUP
2600 Telegraph Rd., P.O. Box 2026
Bloomfield Hills, MI 48303-2026
(313) 456-0000

CMI

A Torchmark Company
2600 Telegraph Rd., P.O. Box 2026
Bloomfield Hills, MI 48303-2026
TWX/TELEX: 810-232-1667 CMI CORP. TRMI
(313) 456-0000

3081-D16 Sale or Lease

3081-K24 Sale or Lease

For Sale/Lease **4381** 1st Quarter Delivery

3033 All Models

New **Series 1** with Series Operating System "Unix" on the Series 1 IBM Master VAR TM Trademark of Bell Laboratories

3380 Available Now On Any Short Term Lease 3370, 3380, 3375

3890-A6 Available Now **4700** Banking Equipment Buy/Sell/Lease

3725 Lease Financing Available For your System or Ours 2,3,4 or 5 Year Terms

3800 LASER PRINTERS Model 1's Immediate Delivery Model 3's Lease Financing Available-Any Term 3800-3 3211-1 & 3811-1 3800-6 4245-1

Tapes Immediate Delivery **3803-3420** Buy/Sell/Lease

For Sale/Lease **4341-1** **4341-2** Call Now

3278, 3279 3277, 3276 Terminals All Models Immediate Availability

3705-3704 Available for Immediate Delivery Sale or Lease

SYSTEM 38 Model 7 & 8 Available Now New - Used **SYSTEM 38** 2, 3, 4 or 5 Year Terms Lower rates than ICC **8130's** Available Now - Sale or Lease

Series 1 [illegible] All IBM Peripherals Any Used Configuration CDC Fixed/Removable Disks Tape Back-up [illegible] [illegible] NEC Printers Buy/Sell/Lease

---

SERIES 1
4978 CRT'S
FEATURES — PERIPHERALS

LARGE USER HAS COMMISSIONED NATIONAL COMPUTER EXCHANGE TO SELL MULTI-MILLION DOLLAR INVENTORY OF IBM SERIES 1 EQUIPMENT. HUNDREDS OF CPU'S, FEATURES, ATTACHMENTS AND CRT'S. WILL CONFIGURE TO YOUR NEEDS. EQUIPMENT REFURBISHED AND GUARANTEED ELIGIBLE.

CALL THE SERIES 1 HOT LINE 800-624-9299

NATIONAL COMPUTER EXCHANGE

600 North Lunar Avenue • Brea, CA 92621
(IN CALIF.) 714-990-5988 TWX: 910-596-1499

BUY · SELL · LEASE

SERIES-1
S/34 • S/36 • S/38
4300

S/23 S/32 5110-20
Tape-Disk-Printers-Tubes

AMCOM

5200 W 73RD ST MINNEAPOLIS MN 55435 (612)835-4737

CALL TOLL FREE
800-328-7723

FOR SALE
3033 MEMORY
IBM & INTEL
U8-U16
Available Now
Ron Breckner
Data Sales Co.
(612) 890-8838

DATA GENERAL

Hanson Data Systems

Why Worry?

Let DANA Do Your Sweating!

For All Your IBM® Buy/Sell/Leasing Needs

DPD			GSD		
CPU	DISK	TAPE	CPU	PRINTER	TERMINAL
4341	3380	3420	S/34	5211	5251
4331	3375	3803	S/36	5262	5291
3081	3370		S/38	5224	
3083	3350			5225	

Authorized dealer for GBT® and Decision Data® Products Printers and CRT's plug compatible to S/34, S/36, S/38

DANA MARKETING, INC.

800 433-4148
In California call 213 372-8845
Connecticut office 203 359-8040

BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP | BUY SELL SWAP

BIDS & PROPOSALS

TOWN OF WEST HARTFORD

Sealed bids for the sale of a used "Honeywell 429 Computer System" will be received in the office of the Purchasing Division, Room 10, Town Hall, 28 South Main Street, West Hartford, Connecticut until 3:30 PM on July 6, 1984 at which time they will be publicly opened and read. Bid forms and specifications may be obtained in the Purchasing Division Office at the above listed address.

ARTHUR C. GEISEL
Materials Manager

NCC 1984

The National Computer Conference is the biggest and most important conference in the world and it is going to be held July 9-12, in Las Vegas, Nevada this year! The NCC issues will have a readership of over 500,000 readers. This could be one of your smartest advertising moves of the year. Computerworld is giving you the opportunity to reach the show's attendees.

SHOW - July 9th
WRAP-UP - July 16th

Our open line rate is $9.15 per line and the minimum ad size is 2 column inches (1 column x 2" at a price of $256.20). We are $128.10 per column inch. Send us camera-ready copy (negative or velox) or copy to be typeset by us at no extra charge. Enclose any logos, artwork, or borders that you want to use in your ad. We also have a team of ad takers that will accept simple copy over the telephone.

For more information call or write:

COMPUTERWORLD
Classified Advertising
375 Cochituate Road
Box 880
Framingham, MA 01701

(617)879-0700
(800)343-6474

Telecopiers: 410 451

The Bulletin Board

BURROUGHS

BUY SELL LEASE
All Systems & Peripherals
AVAILABLE
• B1955 Sys • B1985 Sys
• B80s • B800s
(Configured To Your Specs.)
• Visual 200 Terminals
• B9 Terminals model 100 & 110
• TD830s, MT983s, MT985s
• 206 & 207 Type Disk Drives
• Various Tape Sub-systems
• Memory Upgrades
• Printers 9246 & 9249 Styles
Guaranteed Burroughs Maint.
Depot Maintenance Available
COMPUTER PROVISIONS
(216) 349-7976
(Member ASCDA)

BUY • SELL • LEASE
B1700 • B1800 • B1900
(Custom Config. Install. Avail.)
[illegible] through B7900
[illegible]/207/[illegible] Disk
[illegible]/47/49 Printers
Mag Tape Subsystems
TD830 • MT983 • B76 • Datamatix
TU/OC/CP/TT Terminals
Installation & DEPOT M/A Available
UFP Corp. (216) 579-1166

Original Purchaser To Sell B6810: 207 Disk, 2 Fast Printers, Data Com Processor, Terminals, 3 Tape Units, + Other Equipment
Under Maintenance
Call and Make Offer To:
H. Hughes (801) 968-6810

PRIME

PRIME
LARGE SELECTION
OF USED PRIME
COMPUTER SYSTEMS
...SAVINGS TO 50%
Peripherals also available:
Memories-Disk Drives
Controllers-Modems
Terminals-Printers
1st SOLUTIONS
...Your Alternate Source
1st SOLUTIONS, INC.
2001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-0999
ASK FOR DON OR MATT

WANG

ERST Is The Leading Dealer In WANG Equipment:
2200 • VS • WP • PC
CPUs, Terminals, IOPs, Controllers, Printers, Memory Upgrades.
Plug Compatibles.
Rental And Leasing Prices Quoted On Request.
Call Toll Free:
1-800-FOR ERST
In New York: (212) 431-1100
ERST International Corporation
225 Lafayette Street
New York, NY 10012

FOR SALE
WANG 220T 64K
4 CRT's
Two 10 Megabyte Disk Drives
Diskette Drive
GE Terminet 340 LPM Printer
$2,000 - or best offer
Contact: Sandi Rudd
(205)939-6267

WANG

BUY • SELL
MVP/LVP • OIS • VS • PC
SYSTEMS IN INVENTORY
VS/80 • MVP • WPS30
AND PERIPHERALS
2246C • 2246R • 5536-4
[illegible] EQUIPMENT MARKETING
[illegible]
([illegible]) 377-[illegible]

Pssst...
WANG USERS.....
HAVE YOU HEARD ABOUT THE GROUP OF FORMER WANG EMPLOYEES IN ATLANTA WHO BUY & SELL USED WANG EQUIPMENT AND PLUS COMPATIBLES?
I.C.A. (404) 977-4366 or
1-800-241-3199

HONEYWELL

LEVEL 6 & DPS 6 EQUIPMENT
NEW & REFURBISHED
Systems • Peripherals • Memory
CRTs • Applications Software
SUBSTANTIAL DISCOUNTS
[illegible] Computer Services Ltd.
100 [illegible] Rd.
Northboro, MA 01532
(617) 393-[illegible]
TWX 710-347-7974

Honeywell DPS6
1-CPU 20 MB Cartridge Module Disk
1 Meg total memory
Printers, Controllers, Port
CRT's
and more
Call ABBY
(201) 462-[illegible]

PRINTERS

PRINTERS
Decision Data Printer
for your 370, 4331, 4341.
2 year old, 1000 Lpm printer.
For only $15,000
or best offer.
Call Jim Ford 503-231-5060

DEC

DEC
BARGAINS

11/34A CPU Set	$1,585
11/44 KE44-A "CIS"	$2,775
4A-CI780 Spares Kit	$9,800
BDV11-AA	$365
DR780-AA	$7,500
DZ11 MUX Brd.	$1,125
DZ32-A	$2,175
DZ32-B	$1,870
FP11A	$1,185
KK11-A	$1,785
KK11-B	$2,475
MS11-MB	$1,075
MS780-CE	$14,500
MS780-DC	$3,100
MSV11-LK	$575
MSV11-PL	$1,275
RLV11	$775
VAX 1MB MS730-CA	$2,850
VAX 1MB MS750-CA	$2,850

Call Ray
at QEI, Inc.
(617) 275-6900

VT220 (New)	$1,295
VT100 (Used)	$995
RX02	$1,095
RA81	Call
11/73	Call
11/730	Call

Digital Computer Resale
Call (713) 446-[illegible]

DEC

DEC NEW & USED

PDP11/40	[illegible]	MK11-BB
PDP11/45	H744	RH11
11/70 parts	H745	RH780
DB11-A	H754	RK11D
DD11-CF	KE44-A	RKV11D
DD11-DK	KK11-A	RL01-A
DL11-E	KT11-C	RM05-C
DL11-W	KT11-D	RP04 parts
DMC11-DB	KY11-LB	RP05 parts
DMC11-DA	LA36-CE	RP06-C
DMC11-MD	LA37-CE	TA11-AA
D211-C	LA120-DL	TM11 [illegible]
[illegible]-B	LP11-[illegible]	TM11-EA
[illegible]-C	LPV11-[illegible]	TU45-AE
[illegible]-E	LP11 [illegible]	TU77-FB

PACIFIC COMPUTER SALES
(303) 322-1112

VAX 730
RL02/R80
VAX 750
TU80/RA81
VAX 780
2RP07/TU77
Access International
Glen Freeman
(617) 367-3690

We Buy and Sell DEC Systems and Components. Wanted: VAX and 11/70 Processors.
Alphabyte
550 S. State College Blvd.
Fullerton, CA 92631
(714) 680-8511

New CDC Disk Drives,
Fully Warranted For Ninety Days.
Includes Installation, Safety
Shielded Flat Ribbon Cables,
Stand, And Terminator Card.
Call Toll Free: 1-800-FOR-ERST
In New York: (212) 431-1100
ERST International Corporation
225 Lafayette Street
New York, NY 10012

DEC SYSTEMS IN STOCK
Micro PDP-11 w/Winchester Floppy
Micro J-11 w/Winchester Floppy
J-11 Upgrade Kits
J-11 w/RL02's
PDP 11/23 w/RL01's
PDP 11/23 w/RL02's
LA 100 Printers
Competitive Prices, Eligible DEC Maint.
BBC Systems, Inc. (617) 449-[illegible]

FOR SALE BY OWNER
PDP 11/24 w 1-1/4
MB MEMORY
2 ITOH 101 CRTS
3 DEC RL02 10 MB Disks
DIGIDATA 45 ips TAPE
SANTEC 65-300 CPS PRINTER
Call L. LUHRS
201-[illegible]-4732

BUY • SELL • TRADE

1124-DC	M7238	RP04/5-C
11X44-FA	MK11-CE	RP06-AA
DZ11-A	RH70	RX211-BK
DZ11-E	RH780	TU80-AA
LA120-DA	RM03-AA	VT100-AA
LA180-EA	RM80-C	VT1XX-AC

NEW YORK COMPUTER EXCHANGE
(516)752-[illegible] (800)645-[illegible]

FOR SALE BY OWNER
DEC 11/23 SYSTEM
Includes PDP 11/23-128Kb,
RX01, RL02, VT101 (2),
VT52, Cabinet
$9,000 Or Best Offer
Available Now
(607) 937-2999

VAX 780
2 Mb, 2 RM05s, DZ11s, TE16,
LP11, LA120, Expan. Cab., VMS
Immediate Availability
Short Or Long Term Leases
Brookvale Associates
800 645-1167
New York (516) 273-7777

DEC & DEC COMPATIBLES
Processors PDP 11's
Disks and Tapes
RM05, RA81, [illegible]
Control Data Disk Drives
TWU77, Kennedy 9000, Cipher 75IPS
Terminals
VT100/AVO Special $000
LA120, LA120
Install. & Maint. Services Avail.
Spartan Systems (718) 458-0771

DEC

DEC NEW & USED
BUY • SELL • EXCHANGE
Systems • Processors • Memory
Options • Peripherals • Modules
LAKEWOOD COMPUTER CORP.
P.O. Box [illegible]
San Jose, CA [illegible]
([illegible]) [illegible]

11/34	$5,200
11/44	$16,995
2080	$39,995
DF96	$495
LA120RO	$1,295

Digital Computer Resale
Call (713) 446-0882

MISC.

Buy • Sell • Lease
• Short Term Rentals •
DATAPOINT
FOR SALE
(2) 4600 Mini System
(3) 6000 128K Processor
(20) 3600 CRTs
(1) 9301 Disk Extension
(1) 9200 300LPM Printer
(1) 9375 Disk Extension
(4) 6601 128K Processors
(1) 9394 Tape Drives
(50) 9462 Multiports
Plus Misc. Memory Boards
AVAIL IMMEDIATELY
Cougar Computer Corp.
(216) 261-3600

BUY - SELL - LEASE
DATAPOINT
HARDWARE & SOFTWARE
•Turnkey Systems •FAMS Software
On-Line Accounting
(713) 529-9613

NEW & USED
RAISED FLOORING
Inspect. del. & quality invest.
Serving US, Europe & Scandinavia
Relocated Computer Floors, Inc.
6 Sullivan Street
Westwood, NJ 07675
(201) 666-[illegible], TLX #13-[illegible]

IBM

FOR SALE BY OWNER
Formation 4000
Computer System
EQUIVALENT TO IBM 4331-11.
RUNS ALL IBM SOFTWARE
INSTALLS IN
OFFICE ENVIRONMENT
Ideal For Business
Or CAD/CAM Applications
System Includes:
• Processor (.28 Mips) With 2 Mbyte Memory And Operator's Console
• 280 Mbyte Of Disk Storage (3330's)
• 600 LPM Printer W/Acoustic Cover
• 1600 BPI Mag Tape Drive
• 8 Each 3277 Type Terminals
• Communications With
4 Each BSC Lines
14 Each Async Lines
• UNDER MAINTENANCE
AVAILABLE NOW
Call Mike Wilson
At (215) 646-7710
Or Send Bid To:
AUTOMATED SYSTEMS INC.
1777 Walton Road
Blue Bell, PA 19422

SALE OR LEASE
S/36
Model B-24
New ITC Qualified
Priced Below IBM List
Will Take System 34 In Trade
Call Ron Gibb
(914) 238-8631

IBM

BUY SELL LEASE TRADE
S/34 S/34 S/38
Available Now All System 34
Upgrades And Features
5340-C36, E36, F37
5360s All Models
3262s
5256 Model 3s
5251 Model 11s
5291 Model 1s
5251 Model 12s
Immediate Delivery -
Guaranteed IBM Maintenance
PROCOM
"The Professional
Computer People"
(212) 279-1717

For Sale or Lease
3278-2's [illegible] Per Month
3274 Controllers
From $[illegible] Per Month
4341-L2/M2
From $[illegible] Per Month
4331-L2
From $[illegible] Per Month
3287-2
From $[illegible] Per Month
SYSCOMP
St. Paul, MN (612) [illegible]
Clearwater, FL (813) 799-[illegible]

PRINT TRAINS
IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(813) [illegible]-8481

New UDS Desktop Modems
201C 2400BPS........$[illegible] Each
208A/B 4800BPS.....$1610 Each
INSTOCK NOW
QTY DISCOUNTS AVAIL.
Call Clark Bush
(818) 984-[illegible] In Calif.
or (800) [illegible]

3851 Mass Storage Device
For Sale
3851 Data Cartridges
Available
We Buy & Sell
Contact: Tyus Corporation
(815) 455-[illegible]
[illegible] Factory Road
Crystal Lake, IL 60014

Fox Computer Sales
Buy • Sell • Rent • Lease
Datapoint • IBM
Teletype
W.T.B.: Used Equipment
195 Alpha Drive
Cleveland, OH 44143
(216) 449-[illegible]

Buy .....Sell..... Lease
IBM MICR
3890 - 1419
1255 - 3694
(613) 722-4534

BUY • SELL • LEASE
IBM
Brown Financial & Leasing Corp.
1702 N. Collins, Suite 211
Richardson, TX 75080
(214) 783-[illegible]

FIRE KING STORAGE
SAFES (2)
With Disk Pack Shelving
Fire Resistant, Never Used
Original Cost $4,000 Each
Best Offer
Contact John Hawley
(513) 299-2111

Buy • Sell • Lease
IBM
Cougar Computer Corp.
Suite 216
26250 Euclid Office Plaza
Euclid, OH 44132
(216) 261-3600

IBM

FIRE SALE
SYSTEM 34 E35
CPUs - $12,000 Each
Lessee Pays Transportation
(415) 772-[illegible]
US Equipment Sales

IBM
SYSTEM 38
MODEL B34
512K, [illegible],
MLCA with 2 Lines
and Expansion Feature
Available Immediately
([illegible]) [illegible]

4341-L2, M2	
4341-M2	Sub-Lease
3136 J	
3880-4	
3420	All Models

Vargo Companies
(313) 254-2950

4331-K2
w/1421, 1201, 1601, 3201,
3701, 4686, 4610, 5346, 8601
3278-2A Console
Available Now
Call Bill Hagan
(914) 238-8631
Computer Merchants Inc.

SALE OR LEASE BY OWNER
8381-7[illegible]1
S/N [illegible]
Available July 1, 1984
Model 2 Upgrade Available
Will Configure
Peripherals Available
Premier Computer Sales, Inc.
(816) 716-[illegible]
Tom Hawkins

Sale or Lease
4341 L2
Available Immediately
Memorex 2060-3
Leasing Technologies Inc.
(703) 442-7933

4331-L02
w/1001, 1421, 1601, 2001,
3201, 3401, 3701 (4),
4686 (4), 5248, 5831
$70,000 Or Best Offer
Available 7/2/84
(607) 937-2999

By Owner
IBM SYSTEM 34
Model-E34
128K, 64MB, 8D
5211-001 Printer, 160LPM
IBM Maintenance
Available Mid July
$11,[illegible]
Call Jack Lyons
(617) 475-[illegible]

FOR SALE
IBM Datamaster System 23
CPU & CRT
5324 model 124 64k 2.2mb
display & keyboard module
Brand New
$[illegible]
1-800-345-[illegible]
1-800-[illegible]-1012 in PA

For Lease
4361-ML5
24 Month $[illegible]
36 Month $[illegible]
Available In August
Call Collect
Jim York
Syscomp
(813) 799-4916

SALE OR LEASE
S/38
Model 881
Upgrade To Mod. 8 Available
Available Now
Call Ron Gibb
(914) 238-8631

IBM SERIES 1
Buy Sell Lease
4974-1 Printers
4973-82 Line Printer
4978-61 CRT
Available Now
Computer Hardware Inc.
[illegible] Lakeland Blvd.
Wickliffe, OH 44092
(216) 585-[illegible]

HEWLETT PACKARD

HP DISC DRIVES
7925S 120Mb $8,750
7933H 404Mb $22,900
SAVE THOUSANDS

HP 3000 SERIES 64
Most any configuration upgradeable to Series 68
SAVE AT LEAST [illegible]
All items in stock - immediate delivery. All warranted to qualify for HP Maintenance
CenAm Corporation
1307 Santa Monica Mall, Ste 208
Santa Monica, CA 90401
800/843-4664 CA-213/458-3843
Telex: 215 604 FCS UR

HP 3000
BUY • SELL • RENT • LEASE
Complete Systems
Processors • Peripherals • Parts
CenAm Corporation
Santa Monica, California
(213) 458-3843 (800) 843-4664
Telex: 215 604 FCS UR

Buy-Sell-Lease
HP3000 3X, III, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-4310

For Sale
HP 2608A Printer
400 LPM
$3500
Call Ronald Geigel
(201) 334-4042

MISC. SYSTEMS

FOR SALE/LEASE
USED NIXDORF
EQUIPMENT
[illegible]
Terminals and Comm.
METRO SYSTEMS, INC.
P.O. Box 4697 Tulsa, Ok 74104
Bob Millsap, 918-743-6351

FOR SALE
Nixdorf 8845 Mini
Computer with W/P
LQ PTR
33 MB DISK, 1 DISKT
Contact Gerda Carlson
612/830-2576

DATA GENERAL

Desktop Generation
10, 20, 30 Immediate Delivery
Systems, Software, Service
Copley Management
(617) 769-8430

NEW DG CRT's
D-210 ..... $735 D-410 ..... $1295
D-211 ..... $845 D-460 ..... $1395
Desktops: Call for our special offer
Prices Include Spreadsheet Program
Any & All DG Cables In Stock
We Will Not Be Undersold On
Any New or Used DG Equipment
[illegible]
[illegible]

DATA GENERAL

ECLIPSE C150 SYSTEM
Complete With
Peripherals
(214) 862-5571

NCR

FOR SALE
NCR 2261
Teller Terminals
w/Revision 24 or 25 and
PILA Adapter
On-Line Operational
$2100.00 Ea.
Contact:
George Polcer
Southwest Bank
Vista, Calif.
(619) 941-0476
or 941-0467

For Sale By Owner
NCR-V8555M
2048 KB Memory
High Speed Trunk
Console and Thermal Printer
Available Immediately
Under NCR Maintenance
Call Larry Perlman
(217) 875-1440

ORDER FORM

COMPUTERWORLD BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 461) should be clearly typewritten. Ads may be given over the phone to our ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $115.00 (One unit minimum and no fractional units allowed.) There are no agency commissions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Ad size desired: ________ **columns wide by** ________ **inches deep.**

Issue Date(s): ____________________

Section: ____________________

Name: ____________________

Company: ____________________

Address: ____________________

Telephone: ____________________

Signature: ____________________

Send this form to:

COMPUTERWORLD
CLASSIFIED ADVERTISING
375 Cochituate Road, Box 880
Framingham, MA 01701

SOFTWARE FOR SALE

Foreign Editorial/ Sales Offices

England: Martin Durham, CW Communications Ltd., 99 Greys Inn Rd., London WCI 8UT. Phone: 01-831-9252, Telex: 262346.

Euan Rose, Bill Dunlop, Stephen Thomas, Beere Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215350.

France: Axel Leblois, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14. Telex: 613234 F.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3882, Telex: 252-4217 (Computerworld Japan only).

H. Kajiyama, Tokyo Representative Group, Sanshin Kogyo Bldg. 3F, 2-10 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101, Phone: (03) 230-4117/8, Telex: J26860 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 614-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Gravina, 13, Madrid 4. Phone: 231-23-86; 231-23-86; 231-23-86. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27566 cwden.

Sweden: Bengt Marnfeldt, Nova Media, Nova Media AB, Vartavagen 55, 11538 Stockholm. Phone: 08-234280. Telex: 8105099 NOVACW.

The Netherlands: Johannes A. Witvoet, Mgr. Dir., Computerworld Benelux, Van Eeghenstraat 84, 1071 GK Amsterdam. Phone: 020-646426. Telex: (844) 18242.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-5583/5584. Telex: 22644.

Norway: Mr. Per Bernefjord, Editor, CW Norge A/S, Hovinveien 43, P.O. Box 2862, Toeyen, Oslo 6. Phone: 2/647725. Telex: (856) 76476

Southeast Asia: Mr. David Naidu, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-4444. Telex: (786) RS 37003

Ian Mclean, Asia Computerworld Pte. Ltd., 2023 Swire House, 8 Connaught Rd. Central, Hong Kong. Phone: 210395. Telex: (780) 72827 HX COMWR.

Saudi Arabia: Mr. Omar Dusuki, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6675916/6650380. Telex: (928) 401205.

ADVERTISERS INDEX

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Publisher/Vice-President/Donald E. Fagan

Director/National Sales/Edward P. Marecki
Manager/Marketing & Sales Operations/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Manager/Ronald Mastro
District Managers/Sal McClure, Jayne Donovan,
Michael F. Kelleher
Sales Assistant/Alice Longley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
District Managers/Arthur Kossack, Russ Gerches
Sales Assistant/Joan F. Brodowick
COMPUTERWORLD, 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1350
Eastern Regional Director/Michael J. Masters
Senior District Manager/Doug Cheney
District Managers/Ray Corbin, Joan Daly, Fred Lo Sapio
Sales Assistant/Gale M. Paterno
COMPUTERWORLD, Paramus Plaza I,
140 Route 17 North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1230
Senior District Manager/Bob Hubbard
District Manager/Bernie Hockswender
Western Regional Director/William J. Healey
COMPUTERWORLD, 18004 Sky Park Circle, Suite 280,
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7330
Western Regional Director/William J. Healey
Senior District Manager/Barry Milione
District Manager/Ernie Chamberlain
Account Manager, Classified/Nicole Boathman
Account Manager/Barbara Cramer
COMPUTERWORLD, 300 Broadway, Suite 20,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0758
District Manager/Jeffrey Melnick
Eastern Regional Director/Michael J. Masters
COMPUTERWORLD, 1853 Peeler Road, Suite D,
Atlanta, GA 30338

HOUSTON SALES OFFICE (713) 952-1220
District Manager/William Mahoney
Western Regional Director/William J. Healey
COMPUTERWORLD, 8401 Westheimer, Suite 110,
Houston, TX 77063

CLASSIFIED ADVERTISING (617) 879-0700
Al DeMille
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Diane La Muraglia
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700
Manager, West Coast/Peter Crockett
COMPUTERWORLD, 1060 Marsh Road
Menlo Park, CA 94025
(415) 328-8064

CW COMMUNICATIONS/INC.

Board Chairman
Patrick J. McGovern
President
W. Walter Boyd
Executive Vice-President
Lee Vidmer

Publisher/Vice-President, Donald E. Fagan. Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Phelan. VP-Finance, William P. Murphy. VP-Editorial, John Whitmarsh.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1153.

SALES — National Director, Edward P. Marecki. Corporate Advertising Administrator, Frank Collins. Manager/Marketing & Sales Operations, Kathy Doyle. Display Advertising Supervisor, Anne Hadley. Display Advertising, Deborah Boyer, Pam Valentinas, Carolyn Medeiros, Cindy Chaloux, Mary Waddick. Classified Operations Manager, Cynthia Delany.

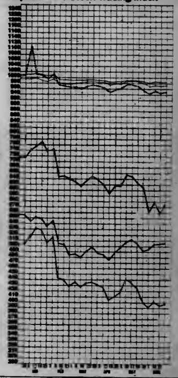
COMMUNICATION SERVICES — Group Vice-President, Jack Edmonston. Director Research, Kathryn Dinneen. Sales Promotion Director, Liz Johnson.

PRODUCTION — Production Director, Peter Holm. Production Manager, Marlene Stibal. Paste-Up Manager, Trish Gaudette. Systems Manager, Tom Pfau. Typesetting Manager, Carol Polack. Art Director, Tom Monahan. Graphic Designer, Hank Fling.

CIRCULATION — Group Vice-President, Margaret Phelan. Circulation Manager, Jane Dauberg. Fulfillment Manager, Maureen Burke.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. Computerworld is indexed; write to Circulation Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JUNE 20, 1984

All statistics compiled, computed and formatted by TRADE QUOTES INC - Cambridge, Mass. 02139

E X C H		1983-84 RANGE (1)	CLOSE JUN 20 1984	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	11- 24	10	+ 1/8	+1.0
O	ALTOS COMPUTER SYST	8- 28	10 3/4	+ 3/8	+3.6
A	AMDAHL CORP	8- 30	11 1/2	- 1/4	-2.1
O	APPLE COMPUTER INC	18- 33	30 1/4	+ 1/2	+1.6
N	AT&T	15- 70	17 3/8	+1 3/4	+11.1
N	BURROUGHS CORP	28- 38	51 7/8	+ 3/8	+0.7
O	COMPUTER AUTOMATION	8- 17	5 7/8	- 1/8	-2.0
A	COMPUTER CONSOLES	8- 28	18 3/4	0	0.0
N	CONTROL DATA CORP	31- 62	32 1/4	+ 1/8	+1.0
O	CONVERGENT TECHNOL	12- 41	13	+ 3/8	+2.9
N	CRAY RESEARCH INC	20- 38	28 1/2	+3 1/8	+9.8
N	DATA GENERAL CORP	10- 40	40 1/4	+4 1/8	+10.2
N	DATAPOINT CORP	11- 38	24 7/8	+ 1/4	+1.2
A	DIGITAL EQUIPMENT	62-120	87 3/8	+1 1/2	+1.7
O	DECO INC	8- 18	14 1/8	- 1/8	-0.8
N	ELECTRONIC ASSOC.	9- 18	8 5/8	+ 3/8	+7.1
N	FLOATING POINT SYST	13- 44	18 3/4	+ 5/8	+3.8
N	FOXBORO	22- 47	28 7/8	-1 5/8	-5.3
N	GENERAL AUTOMATION	3- 10	5 1/8	- 1/8	-2.6
N	GOULD INC	26- 44	27 3/8	+3 1/4	+3.8
N	HARRIS CORP	20- 51	29 3/8	-1 1/8	-3.1
N	HEWLETT-PACKARD CO	23- 38	37	+3 1/4	+9.6
N	HONEYWELL INC	28- 38	53 7/8	+4 1/4	+8.6
N	IBM	97-138	108 1/8	33 3/4	+3.8
O	IPL SYSTEMS INC	3- 14	3	+8	-40.0
N	M/A-COM INC	19- 38	20 1/4	+1 3/8	+7.0
O	MANAGEMENT ASSIST	7- 20	13 3/4	0	0.0
N	MATSUSHITA ELEC(ADR)	67- 88	71	-1 3/4	-2.4
O	MODULAR COMPUTER SYS	6- 18	7	+ 1/8	+1.8
N	MOHAWK DATA SCI	8- 18	10 1/4	+ 7/8	38.6
N	MOTOROLA INC	11- 49	33 1/8	+1 1/4	+3.8
N	NAT'L SEMICONDUCTOR	12- 30	13	+ 7/8	+7.2
N	NBI INC	17- 44	23	+2 1/8	+10.8
N	NCR	10- 34	24 1/2	- 1/4	+1.0
N	PERKIN-ELMER	27- 37	21 7/8	+1 1/4	+6.0
N	PRIME COMPUTER INC	11- 30	16 5/8	+ 5/8	+3.8
N	SPERRY CORP	21- 38	38 3/8	+3 1/8	+8.0
N	TANDEM COMPUTERS INC	14- 40	20 7/8	+1 3/4	+7.8
N	TANDY CORP.	28- 30	28 3/8	+1 1/8	+4.0
O	TELEVIDEO SYSTEMS	9- 41	8 1/4	+ 3/8	+8.0
O	TELEX CORP	9- 18	10 5/8	- 3/8	-3.4
N	TEXAS INSTRUMENTS	71-176	128 5/8	- 3/8	0.0
O	ULTIMATE CORP	8- 30	10 7/8	+1 7/8	+18.4
O	VECTOR GRAPHICS INC	1- 14	3/4	+	+0.0
A	WANG LABS "B"	18- 42	27	+5	+3.8
A	WANG LABS "C"	14- 42	28 7/8	+ 7/8	+3.3
N	XEROX CORP	33- 52	38 3/4	33 1/4	+8.8
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CO	8- 21	10 1/4	- 1/4	-1.2
N	COMDISCO INC	7- 40	10 3/8	+1 1/8	+12.3
O	CONTINENTAL INFO SYS	3- 18	8 1/4	+ 1/2	+2.8
N	DPF INC	9- 18	11 3/8	+ 1/8	+1.0
O	PHOENIX AMERICAN INC	8- 17	8 1/4	+ 1/4	+4.1
O	SELECTERM INC	11- 21	20	0	0.0
N	U.S. LEASING	18- 47	30 3/4	0	0.0
	COMPONENTS				
N	ADVANCED MICRO DEV	12- 37	32	+1 1/8	+8.0
O	ADV M SEMICONDUCTOR	12- 26	20 1/2	- 1/4	-1.0
N	ANALOG DEVICES INC	16- 30	29	+4 3/8	+8.8
O	ANALOGIC CORP	12- 27	16 1/4	-1 3/8	-10.8
N	APPLIED MAGNETICS CP	12- 37	11 1/2	-1 1/8	-8.0
N	TERADYNE	10- 38	27 1/2	+ 1/2	+1.8

E X C H		1983-84 RANGE (1)	CLOSE JUN 20 1984	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	3- 8	4 3/4	0	0.0
N	ADVANCED SYSTEMS INC	14- 22	18 7/8	0	0.0
O	AGS COMPUTERS INC	10- 30	18	+ 1/8	+1.6
O	AMERICAN SOFTWARE	12- 31	12 3/8	- 1/4	-1.8
N	ANACOMP INC	5- 18	5 3/4	- 3/8	-12.0
O	ANALYSTS INTL CORP	9- 17	8 1/4	+3 1/4	+29.0
A	APPLIED DATA RES.	18- 33	18 3/8	+ 3/8	+2.0
O	BRG COMPUTER SYSTEMS	13- 31	15 3/4	+ 1/4	+1.8
O	AUTOMATIC COMP INC	1- 7	1 3/8	+ 1/2	+10.0
N	AUTOMATIC DATA PROC	30- 40	30	+1 3/8	+8.2
O	CSA COMPUTER ASSOC	8- 17	16	+ 1/2	+1.6
O	COMPUTER ASSOC INT'L	10- 20	17 1/8	+1	+8.0
O	COMPUTER HORIZONS	8- 28	8 1/8	-1 1/8	-12.8
O	COMPUTER NETWORK	8- 11	8 1/4	+ 1/4	+3.6
N	COMPUTER SCIENCES	11- 23	18 1/4	- 1/4	-2.4
O	COMPUTER TASK GROUP	12- 18	10 1/8	- 1/4	-1.8
O	COMPUTER RANGE	8- 18	7	+ 1/2	+7.8
O	COMPUTONE SYSTEMS	4- 23	3	0	0.0
O	COMSERV CORP	7- 30	8 3/8	0	0.0
O	COMSHARE	7- 18	8 1/8	+ 3/8	+8.0
N	CULLINET SOFTWARE	24- 40	37	+3 1/8	+8.8
O	CYCARE SYSTEMS INC	18- 20	17 1/8	- 1/8	-0.7
N	ELECTRONIC DATA SYST	20- 33	30 1/8	+8	+0.7
O	HOGAN SYSTEM INC	10- 27	13 3/4	+1	+7.8
N	GENERAL ELECTRIC CO	30- 38	54 1/8	+1 1/2	+2.1
O	GTE CORP	30- 40	38	+ 7/8	+2.8
O	INFORMATICS INC	10- 30	32 1/4	+ 3/4	+9.4
O	INFORMATION SCIENCE	8- 17	4 3/8	+ 1/4	+3.8
O	INFOSTORE SYSTEMS CO	23- 43	38	+2 1/8	+6.4
O	KEANE ASSOCIATES	8- 18	8 3/4	0	0.0
A	LOGICON	18- 31	33 1/2	+ 3/8	+2.8
O	MCI COMMUNICATIONS	8- 28	7 7/8	0	0.0
O	MGMT SCI AMER INC	15- 20	10 3/4	- 3/4	-8.1
O	MATHEMATICAL APP GRP	7- 18	8 1/8	-1	-13.0
O	MICRO SYSTEMS INC	31- 38	38 3/4	+ 3/8	+1.0
O	MONCHIK-WEBER CO	6- 22	6 1/2	- 7/8	-13.7
O	NATIONAL DATA CORP	14- 28	14 1/2	- 7/8	-5.8
O	ON-LINE SOFTWARE INT	8- 28	8 1/4	0	0.0
O	PANSOPHIC SYSTEMS	11- 30	18 3/4	- 3/8	-0.8
O	PLANNING RESEARCH	12- 31	18 1/2	+ 1/2	+8.8
N	POLICY MGMT SYSTS CO	30- 38	38 1/2	+ 3/4	+2.0
O	PROGRAMMING & SYS	4- 8	4 1/8	- 1/2	+0.7
O	REYNOLDS & REYNOLDS	20- 33	33 1/8	+ 1/4	+0.8
O	SCI CORP	13- 24	14 1/8	0	0.0
O	SHARED MEDICAL SYST	20- 40	30 1/4	+ 7/8	+3.6
N	SCIENTIFIC COMPUTERS	8- 16	8	+ 1/4	+3.6
O	SOFTWARE AG	8- 19	10 3/4	+ 3/8	+3.8
N	URS CORP	10- 18	10 1/4	- 3/8	+0.7
N	WCCO	7- 17	8	-8	+11.1
	PERIPHERALS & SUBSYSTEMS				
O	AA INTERNATIONAL	6- 7	6 1/8	- 1/2	-8.8
A	ANDERSON JACOBSON	7- 20	8 3/8	+ 1/2	+1.6
O	AUTO-TROL TECHNOLOGY	10- 20	10 3/8	- 3/8	+3.8
O	BANCTEC INC	7- 20	7 3/4	0	0.0
O	BEEHIVE INT'L	3- 15	3	- 1/2	-8.0
N	BOLT,BERANEK & NEW	17- 30	18 3/4	- 7/8	-4.8
O	CAMBEX CORP	1- 3	1 1/8	0	0.0
N	CENTRONICS DATA CORP	10- 30	18	0	0.0
N	CETEC CORP	7- 18	8	- 1/4	-3.8
O	COGNITRONICS	8- 30	8 3/8	- 3/8	-8.8

E X C H		1983-84 RANGE (1)	CLOSE JUN 20 1984	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMPUTER DEVICES INC	6- 18	1/2	-	-8.8
O	COMPUTER TRANSCEIVER	7- 10	8 1/8	0	0.0
N	COMPUTERVISION CORP	30- 73	38 1/8	+1 7/8	+5.0
N	CONRAC CORP	12- 38	12 7/8	+ 1/8	+0.8
O	DATAPRODUCTS CORP	18- 30	18	0	0.0
N	DATARAM CORP	8- 12	8 1/8	- 1/8	-1.8
O	DATA SWITCH CORP	13- 42	17 1/2	-2 3/8	-12.0
O	DATUM INC	8- 17	8	0	0.0
O	DECISION DATA COMPUT	8- 16	10 1/8	- 1/4	-2.4
O	DOCUTEL-OLIVETTI	7- 20	8 1/2	+ 1/4	+3.0
A	ELECTRONIC M & M	8- 11	8 3/4	0	0.0
O	GENRAD INC	8- 18	8 3/4	-1 1/4	-12.8
O	EVANS & SUTHERLAND	17- 38	18 1/4	+ 3/8	+4.2
O	GANDALF TECHNOLOGIES	8- 10	10 1/8	0	0.0
N	GEN'L DATA COMM IND	14- 17	14 3/4	+ 7/8	+6.3
O	GREAT SOUTHWEST IND	1- 3	3/4	0	0.0
N	HAZELTINE CORP	19- 35	20 1/2	+ 5/8	+2.8
O	ICOT CORP	3- 8	3 3/4	+ 3/8	+11.1
O	INFORMATION INTL INC	10- 18	16 3/4	0	0.0
N	INTEL CORP	30- 49	38 1/2	0	0.0
O	IPL SYSTEMS ADR	8- 16	8	-2	-40.0
O	LUNDY ELECTRONICS	7- 18	8 3/4	0	0.0
O	MEMODATA CORP	8- 13	11	+1 1/4	+10.8
A	MSI DATA CORP	12- 30	19 1/4	+ 7/8	+8.3
N	NASHUA CORP	18- 38	28 3/4	+ 5/8	+2.3
O	NETWORK SYSTEMS CORP	18- 34	22 1/4	+ 3/8	+1.7
N	NO AMERICAN PHILIPS	30- 38	31 1/4	+ 1/4	+0.8
N	NORTHERN TELECOM LTD	30- 38	30 3/8	+1 1/8	+3.8
O	ONYX	1- 8	1/8	+ 1/2	+80.0
O	PARADYNE CORP	13- 28	18	+ 1/2	+3.2
N	PERTEC CORP	8- 14	16 1/2	- 1/2	+4.8
O	PHOENIX AMERICAN ADR	8- 17	8 1/4	+ 1/4	+4.1
N	PLESSEY CO (ADR)	30- 41	28 3/4	-3	-8.2
O	QANTRONIX INC	10- 36	40	- 3/4	-3.7
O	QANTEK CORP	8- 23	8 1/4	- 3/8	-10.7
A	RECOGNITION EQUIP	11- 17	18 1/2	+ 1/8	+3.2
N	ROLM CORP	28- 30	38 3/4	+ 3/8	+1.7
N	SANDERS ASSOCIATED	30-120	66	+3 1/4	+7.8
O	SCAN CORP	1- 3	3/8	0	0.0
O	SCAN-TRON CORP	12- 18	10 1/8	- 1/8	-0.8
N	SCIENTIFIC ATLANTA	8- 23	8 7/8	0	0.0
N	STORAGE TECHNOLOGY	8- 23	8 1/8	+ 1/4	+0.8
O	SYKES DATATRONICS	3- 27	8 1/2	+ 1/2	+10.8
O	SYSTEMS & COMP TECH	30- 38	30 1/4	+ 1/4	+1.8
O	T BAR INC	7- 17	8 7/8	0	0.0
O	TAB PRODUCTS CO	8- 20	10 1/8	- 1/2	-0.8
O	TANDON CORP	8- 30	7 3/8	+ 1/4	-3.1
O	TEC INC	8- 13	10 1/8	- 3/8	-3.8
N	TEKTRONIX INC	30- 87	38 3/4	+1 3/4	+3.1
O	TELEX	8- 30	30 3/8	+3 1/4	+10.0
O	TERADATA SYSTEMS CP	3- 17	6 7/8	- 1/2	-11.4
O	TIMEPLEX INC	7- 30	19 3/4	+3 3/8	+18.1
N	VISUAL TECHNOLOGY	8- 30	30 1/2	0	0.0
	SUPPLIES & ACCESSORIES				
O	AMERICAN BUS PRODS.	7- 23	30 1/2	+ 1/4	+0.2
O	BARRY WRIGHT	13- 33	27 3/8	+1 3/4	+0.3
N	DUPLEX PRODUCTS INC	12- 27	23 3/8	- 3/8	-0.7
O	ENNIS BUS. FORMS	8- 28	18 3/4	-1 1/2	-7.8
O	3M COMPANY	68- 30	78 3/8	+3 3/8	+0.8
N	MOORE CORP LTD	38- 51	38 3/4	- 3/8	+1.0
O	STANDARD REGISTER	11- 30	30 3/8	- 1/2	-3.8
O	WALLACE CORP SERVICE	10- 30	30 3/8	- 3/8	-3.4

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

IN BECOMING A MASTER OF DISGUISE WE FORGOT TO TELL THE WORLD ABOUT OURSELVES

WE'RE FALCO DATA PRODUCTS.

We're not exactly a household name, yet. But we have been hard at work over the past 4½ years shipping our great OEM/custom terminals (with other people's names on the case) into all walks of life. Falco terminals are literally popping up everywhere. In the executive offices of the President of the United States. In the U.S. Supreme Court. In both the Burroughs and NCR worlds working as emulation terminals. In a system supplying vital database information to the legal sector. In huge corporations like Lockheed and General Electric. In operations involving the world's most successful international distributor, a leading protocol controller manufacturer, and U.S. and foreign car makers. In the entertainment area. And in hospitals and hotels across the country.

Go with the terminals picked by winners who make their choice based on high performance, compatibility, and capability. Now's your chance to take advantage of all the superior operating features that were formerly only available to OEM/custom clients. For details, contact: Falco Data Products, 1266 Lawrence Station Road, Sunnyvale, CA 94089. (408) 745-7123.

Falco
DATA PRODUCTS
800-538-5383

FAME 100 | FAME II | TS-2 | TS-42 | TS-2624B | ENDURA | TS-100/132 | FAME III | FAME 78

WESTERN REGIONAL OFFICE
1266 Lawrence Station Rd.
Sunnyvale, CA 94089
(408) 745-7123

SOUTHERN REGIONAL OFFICE
2091 Business Center Drive
Suite 100
Irvine, CA 92715
(714) 476-3111

CENTRAL REGIONAL OFFICE
9801 West Higgins Road
Suite 220
Rosemont, Illinois 60018
(312) 823-5340

EASTERN REGIONAL OFFICE
855 Valley Road
Suite 1000
Clifton, New Jersey 07013
(201) 472-2601